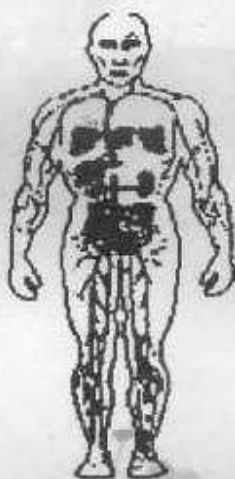
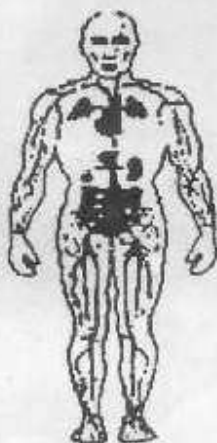


PRINCIPLES OF

GENERAL SURGERY



VOL.1

DR. WALEED KETWALY SAYED

VISIT...

LANZAROTE
Caliente.COM

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Vol. (1)

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With my Best Wishes

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Chapter [I]

**Wounds, Haemorrhage,
Shock & Blood Transfusion**

Chapter [1]

I Wounds

★ Definition :

It is forcible loss of continuity of soft tissues.

★ Aetiology :

Mainly due to Mechanical Trauma.

★ Classification :

(A) Opened Wounds: "In which the skin continuity is interrupted"

① Incised Wounds :

- Caused by Sharp cutting instrument.
- It has clean cut edges with little or no tissue damage.
- It is more liable for bleeding (cleanly cut vessels) & Less liable for infection.

② Lacerated Wounds

- Caused by Blunt heavy instrument.
- It has crushed edges with severe tissue damage.
- It is less liable for bleeding & More liable for infection as Tetanus or Gas gangrene.

③ Stab or Punctured Wounds :

It is caused by Pointed objects as **Daggers**. It is the most dangerous type because internal organs or vessels may have been cut.

④ Gun shot wound:

It have an Intel & Exit.

⑤ Abrasion:

Partial denudation of the superficial layer of the skin due to Friction of skin with rough surface. Treated by Antibiotics.

⑥ Bites: Animal or Human

(B) Closed Wounds : "In which the skin surface is intact"

- ① Contusion (Ecchymosis) : It is extravasation of blood from injured small vessels with no formation of a swelling. Treated by fomentation

② Haematoma :

- It is Localized Extravascular Collection of blood

- Types : ① Subcutaneous. ② Subperiosteal.
- ③ Subfascial. ④ Intra-muscular.

• Sequelae (fate) :

- ① Resolved by absorption ② Localized by fibrosis.
- ③ Infected ④ Calcified.

⑤ False Aneurysm if communicates partial injured artery

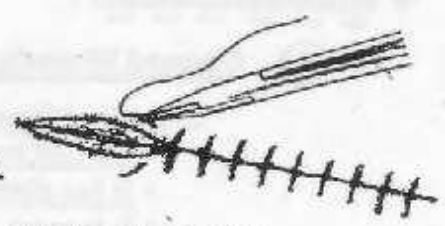
• Treatment : (A.B & Fomentation)

Then pressure bandage if small or Aspiration if large.

* Types of Wound Healing : There are 3 Types :

- ① Healing by Primary Intention : This occurs with clean surgical wounds, there is little amount of Granulation tissues & minimal fibrosis.
So The final result is a fine linear scar.
- ② Healing by Secondary Intention : This occurs with septic surgical wounds, there is Marked amount of Granulation tissues & Marked fibrosis.
So The final result is a weak ugly scar.
- ③ Healing by Tertiary Intention : This occurs after [2ry suture or delayed 1ry suture].
 The aims is to lessen the fibrosis & to obtain a fine linear scar similar to 1ry intention.

* Types of surgical wounds:



- (A) Clean: There is no gross contamination such as Herniorrhaphy and Thyroidectomy wounds.
The Risk of infection is 1-2%
- (B) Clean contaminated: Wounds involve regions of the body that may contain low numbers of resident organisms e.g urological procedures, or surgery on prepared colon.
The Risk of infection is 2-5 %.
- (C) Contaminated: an unprepared region of the body with numbers of endogenous organism is entered e.g surgery on unprepared colon.
The Risk of infection is 5-30%.

* Factors affecting Wound Healing :

(A) General Factors:

- ① Age : Healing is slowly with elderly due to ↓ Protein turn over rate.
- ② Nutritional Status as :
 - Vit. A Deficiency → ↓ Epithelialization.
 - Vit. C Deficiency → ↓ Protocollagen maturity.
 - Protein Deficiency → ↓ Collagen synthesis.Also Ca⁺, Zinc, Copper and Manganese plays a minor role in wound healing.
- ③ Cortisone Administration : as it inhibits Fibroblast proliferation.
- ④ Irradiation: Leads to End arteritis obliterans → Ischaemic wound.
- ⑤ Chronic Diseases: like Uraemia, Diabetes & Malignancy delay healing

(B) Local Factors: Which Impair Wound Healing.

- ① Poor vascularity → ↓ healing (e.g. below knee wounds).
- ② ↑ Tension: by tight sutures or haematoma → ischaemia of the edges.
- ③ Foreign body & Necrotic tissues: impair healing.
- ④ Infection: Bacteria competes with fibroblasts for oxygen, Also bacteria secretes enzymes which destroys collagen e.g. Hyallurindase Enz.
- ⑤ Immobilization : because early movement → capillary damage.
- ⑥ Adhesion to bony surface → decrease wound contraction phase.

* Components of wound Healing :

[1] Wound Contraction:

- This process of contraction helps to diminish the size of the wound.
- It starts immediately & continues for the next 2-3 weeks.

[2] Granulation tissue Formation:

Which is later on replaced by Fibrous tissue

[3] Epithelialization:

The Basal cell layer & the epidermis starts migration over the Fibrous tissue

* Stages of wound healing = (3 phases)

▪ Phase I

Contraction:

This is a mechanical reduction in the size of the defect.
It start 2 days after the injury and complete within 2 weeks.

▪ Phase II

Granulation tissue formation:

A) Inflammation stage: Lasts for about 5 days.

During which there is ↑ Vascularity & ↑ Capillary permeability → exudation of RBCs, WBCs, Plasma and Fibrinogen → fibrin networks. Also ↑ Macrophages → Ingestion of cellular debris from the wound.

B) Granulation stage: Lasts about 2 weeks.

Proliferating Fibroblasts & New capillaries → collagen fibers i.e. ground substance (which will fill the depth of the wound) then mucopolysaccharides & glycoproteins are deposited.

C) Fibrous tissue stage:

Collagen fibers remodelling fibrous tissue (scar) which are arranged along the lines of tension of the wound.

▪ Phase III

Epithelial surface formation:

- **Incised wound:** Basal cell layer of the epidermis starts migration over The fibrous tissue formed in the previous phase, to close the skin surface over the wound.
- **Large open wound:** Epidermis grows for few centimeters and then slow down → leaving a raw area → shallow pale ulcer (Which needs later cover by skin graft).

* Complications of wound Healing :

[1] Wound Failure (wound dehiscence):

■ Definition:

Failure of abdominal wound to heal is called "**Burst Abdomen**".

■ Pathology: (At 6-8th post-operative day)

- Warning (**RED sign**)= Serosanguinous discharge, Soaks the dressing.
- If intestine prolapse through wound → called **Evisceration**.
- If intestine doesn't prolapse through wound → called **Dehiscence**

■ Treatment:

[A] Preoperative care:

- Cover the prolapsed bowel by a sterile dressing.
- Ryle's tube suction.
- I.V Fluids & Antibiotics.

[B] Operative:

The protruded intestinal loops are washed saline and returned to the abdomen, the omentum is spread over the intestine, the abdominal wall is closed as one layer by prolene (**TENSION SUTURES**) then retained at least 3 weeks.

[C] Post-operative care:

Abdominal Binder is used.

[2] Stretching of the scar.

[3] Contracture:

This is pathological shortening of scar tissue resulting in deformities. →

[4] Post-operative wound infection:

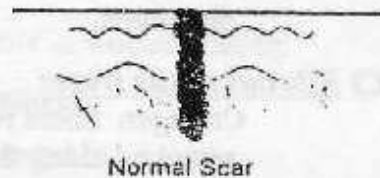
(see chapter 6)

[5] Hypertrophic scar:

- Definition: It is an excessive amount of fibrous tissue Confined to scar
- Aetiology: It occurs Extra-stimulus to fibrous tissue formation during healing such as infection or Excessive tension.
- Treatment: Excision + Plastic repair

[6] Keloid Formation:

- Definition: It is a localized overgrowth of the fibrous tissues extends beyond the original wound into normal tissues
- Aetiology: It occurs after Wounds, Burns or Surgical operations. .
- Treatment: It is Difficult because of high rate of recurrence
 - (1) Pre and post-operative irradiation to ↓ recurrence.
 - (2) Excision.
 - (3) Intra-lesional steroid injections.



* Treatment :

① **First Aid Treatment** "Pre-hospital Management"

- ① Ensure of patent "airway" if patient is unconscious.
 - ② Control of bleeding by compression.
 - ③ Sterile dressing to prevent Contamination.
- Then Transfer patient to Hospital

② **Definitive Treatment** "Hospital Management"

- ① Assessment of injury for associated Visceral, Arterial & Nerve injury.
- ② 4 Anti [Anti-shock, Antibiotics, Anti-tetanic Serum & Anti-gas Gangrene].
- ③ Transfer the patient to Operating Room.

Then According to the onset of wounds. [3 Possibilities] ☞

IF "Wounds within 6-8 hours"

★ **Incised wounds** : There is No contamination & No Risk for infection so do ☞
[1ry suture + suture of all structures including Nerves & Tendons].

★ **Lacerated wounds** : There is Contamination and Risk for infection so do ☞
[Wound Excision] Then [1ry suture].
Nerves & Tendons is repaired postponed 4-6 weeks.

"Wound Excision" It is excision of edges Then Incision of deep fascia Then Identification of Neuro-vascular bundles Then Removal of all foreign bodies Then Excision of all dead muscles.

IF "Wounds From 8-24 hours"

★ **The Wounds Incised or Lacerated** are potentially contaminated so do ☞
[Wound Excision] + Systemic A.B + Repeated dressing to allow the granulation Tissues to fill the wound.
Then IF becomes clean within 4-6 days we do [Delayed 1ry suture].
Or IF becomes clean after 10-14 days we do [2ry suture].

IF "Wounds After 24 hours"

★ **The Wounds Incised or Lacerated** are Infected so do ☞
[Debridement] + Systemic A.B + Repeated dressing to allow the granulation tissues to fill the wound] Then [2ry suture].

"Debridement" It is Removal only of dead & devitalized Tissues with no excision of edges as this will break the body defense against infection & will open new plans for infection.

N.B: **Amputation** is indicated in Severely Crushed Limb, Severely Uncontrolled Infection or Vascular Gangrene

MAJOR TRAUMA & THE MULTIPLE-INJURY PATIENT

* Mechanism of injury:

There are 2 major types of injuries :

[1] Penetrating injuries:

1- Low velocity injuries:

- Caused by knives & other sharp objects.
- Also caused by bullets with low velocity .
- The injury is usually focused over a small area.

2- High velocity injuries:

Caused by a missele so the higher the velocity the more damage.



[2] Blunt injuries:

- 1- Direct blows.
- 2- Fall from a heigh.
- 3- Road Traffic Accident (RTA).

With blunt Trauma there is a tendency for certain patterns of associated injuries e.g. Head & cervical injuries or rupture liver or rupture spleen or fracture pelvis & urethral injuries.

* Causes of Trauma mortality:

Death following Trauma can be classified into 3 groups:
According to Time.

[1] Immediate deaths:

These follow fatal injuries and occur within few minutes after the accident so that little can be done for the victims. Examples of these injuries include major trauma to the brain or upper spinal cord, injuries of the heart or major blood vessels or rupture of the major airway.

[2] Early deaths:

These occur within few hours after the accident and so, with proper and rapid management, the patients have a chance of survival. These cases include intra-cranial haemorrhage, massive intra-abdominal or intra-thoracic haemorrhage, or major fractures.

[3] Late deaths:

These occur Some weeks after the accident generally due to sepsis or multiple organ failure.

MANAGEMENT OF SEVERE TRAUMA & MULTIPLE - INJURY PATIENTS

i.e Management of an Acutely injured patient

Organized Trauma care

The American College of Surgeons developed the **Advanced Trauma Life Support (ATLS)** which is an internationally accepted protocol for the management of major trauma victims. ATLS protocol has three elements.

- (1) Primary survey / resuscitation.
- (2) Secondary survey.
- (3) Definitive treatment of individual injuries.

III Pre - hospital Management:

- (1) *Ensure* of patent "Airway" if patient is unconscious.
- (2) *Control* of Bleeding by compression.
- (3) *Sterile dressing* to prevent Contamination.
- (4) *Immobilize* the fractured part associated.



III Hospital Care:

Primary survey / Resuscitation:

- A= Air way maintenace.
- B= Breathing.
- C= Circulating i.e control bleeding.
- D= Disability i.e. support any fracture.
- E= Exposure of the patients.

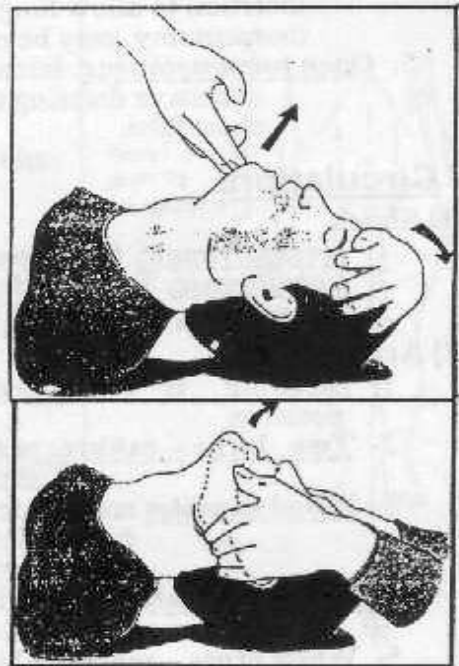
(A) Air way maintenance:

[1] Clear the airway

- 1- Vomit, blood or foreign material should be removed manually (finger sweep) or with a rigid sucker.
- 2- This is followed by chin lift or jaw thrust.

[2] Protect the airway:

- 1- An oropharyngeal or nasopharyngeal airway tube prevents the tongue from falling back and occluding the airway in an unconscious person.
- 2- Tracheal intubation is indicated with .
 - a. Apnoea.
 - b. Inhalation injuries.
 - c. Maxillofacial trauma
 - d. Closed head injuries



Orotracheal intubation allows the use of a large tube. Nasotracheal intubation is safer if the cervical spine appears fractured.

- 3- **Cricothyroidotomy**. This is done either by making a cut and inserting a tube, or by the percutaneous insertion of wide-bore needle.



Cricothyroidotomy

[3] Cervical spine control:

- The cervical spine should be considered unstable in the following situation:
 - 1- **Clinical examination** reveals bony abnormalities or cervical tenderness.
 - 2- **Multi-system trauma**, a blunt injury above the clavicle.
 - 3- **Maxillo-facial trauma**
- Cervical spine immobilization is done using a backboard and a rigid collar.



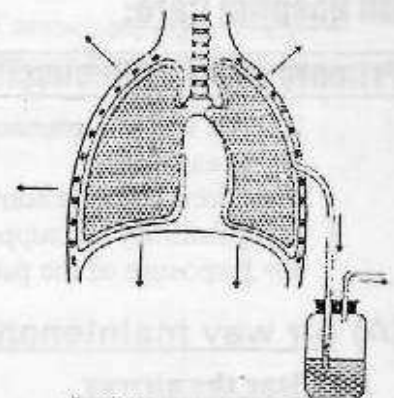
B. Breathing:

[1] Assessment:

1. **Inspection** for Air movement Respiratory rate, Cyanosis, tracheal shift, jugular venous distention and open chest wound.
2. **Palpation** for subcutaneous emphysema and flail segments.
3. **Percussion** for hyperresonance or dullness over lung field
4. **Auscultation** for upper air way sounds as stridor. Wheezing or gurgling and for lower air way sounds over lung field.

[2] The immediately life-threatening thoracic conditions and their treatment are:

1. **Tension pneumothorax**: Needle decompression followed later by intercostal chest tube.
2. **Cardiac tamponade**: Needle pericardiocentesis followed later pericardiectomy and control for source of bleeding.
3. **Flail chest** intubation and positive pressure ventilation.
4. **Massive haemothorax**: initial treatment is by chest tube insertion to allow lung expansion. Later thoracotomy. may be needed if bleeding continues.
5. **Open pneumothorax**. Initial treatment is by an occlusive dressing followed by insertion of a chest tube.



An intercostal chest tube is used to drain air or fluid

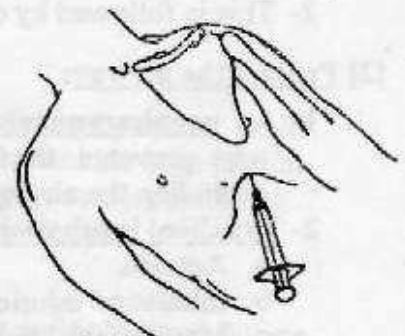
C- Circulation:

[1] Shock

1. **Haemorrhagic**. Commonest
2. **Cardiogenic**. Tamponade and myocardial trauma.
3. **Neurogenic**. Spinal cord injury.

[2] Action

- 1- **Bleeding is controlled** with direct pressure if possible.
- 2- **Two large-calibre** peripheral IV lines are inserted. A central line may also be added.
- 3- **Blood samples** are sent for typing, cross-matching, haemoglobin, haematocrit and blood chemistry.
- 4- **Ringers lactate solution** is infused as a start. Volume of crystalloid needed
- 5- **When cross-matched** blood is available it is to be infused immediately.



Pericardiocentesis

D. Disability:

Common causes of neurological deficits related to trauma are:

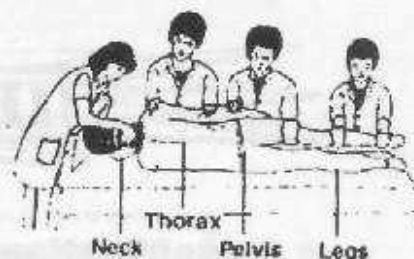
- Head injury, Hypoxia, shock, Alcohol or drug Abuse

AVPU Evaluation

Based on patient's best response.

- A. Alert and interactive
- V. Vocal stimuli elicit a response
- P. Painful stimuli are necessary to evoke a response
- U. Unresponsive

A more detailed assessment using the **Glasgow Coma Scale** (GCS) is performed



E. Exposure and environment:

- (1) **Clothes** All clothes of the trauma victim are removed using sharp large scissors.
- (2) **Warmth** Keeping the emergency room warm and using blankets to prevent hypothermia.
- (3) **Insert**
 - 1- Urethral catheter (Foley's) to monitor output. This is contraindicated if there is blood at the urethral meatus as it usually unsuccessful and may even compound the injury.
 - 2- Nasogastric tube (Ryle's) decompresses the stomach and prevents vomiting and aspiration.

Secondary Survey

- The secondary survey is to be done once resuscitation efforts are under way and X-rays have been evaluated.

- It includes examination of

1. Head.
2. Face.
3. Spine.
4. Neck.
5. Chest.
6. Abdomen.

Diagnostic peritoneal lavage (DPL) are indicated in blunt abdominal trauma, in an adult, that is associated with:

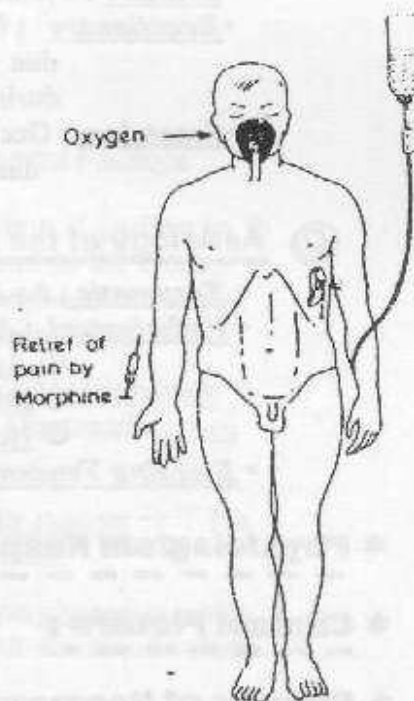
- a) Suspicion of organ injury.
- b) Unreliable abdominal examination because patient is unconscious, e.g., head trauma, or alcohol intoxication.
- c) Unexplained hypotension that may be caused by blood loss.

7. **Perineum**, including rectal examination in all patients and vaginal examination in females.

8. **Limbs** for fractures and for soft tissue injuries including vessels, nerves, and tendons,

9. Nervous system

- Pupils for size, equality, and reaction to light.
- Glasgow Coma Scale.
- Cranial nerves.
- Sensation and motor activity in limbs.



II Haemorrhage

* Classifications :

(A) Site of Bleeding

- External : Bleeding is visible as it occurs through the skin as in Wounds or from body orifice as in Epistaxis.
- Internal : As in Haemothorax or Haemoperitoneum.
- Interstitial : Bleeding occur into the tissues forming a Haematoma.

(B) Types of bleeding vessels

- Arterial : The Blood is Bright red in colour, Comes in Pulsatile jets. & The bleeding is More from proximal than distal end.
- Venous : The Blood is Dark red in colour, Comes in Steady flow & The bleeding is More from distal than proximal end.
- Capillary : The Blood is Bright red in colour and comes as oozing.

(C) Time in Relation to Onset of Trauma

- Primary : Occurs at the time of trauma.
- Reactionary : Occurs within 24 hours after the time of trauma or operation due to slipping of ligatures as a result of restoration of A.B.P during the recovery periods.
- Secondary : Occurs within 7-14 days after the time of trauma or operation due to Sepsis which dissolve the Clot & Erodes the arterial wall.

(D) Aetiology of the Bleeding

- Traumatic : As Accidents "The Most Common".
- Pathological : As
 - ① Atherosclerotic e.g. (Ruptured Aneurysm).
 - ② Inflammatory e.g. (Bleeding Peptic ulcer).
 - ③ Neoplastic e.g. (Haematuria in Renal Cancer).
- Bleeding Tendency : As Haemophilia & Purpura.

* Physiological Response :

* Clinical Picture :

* Classes of Haemorrhage :

* Investigations & Monitoring if shocked :

* Treatment :

See
Hypovolaemic
Shock

III Shock

SHOCK is a Pathological condition that is Characterized by Inadequate Tissue perfusion with impaired it's metabolism

① Hypovolaemic Shock (نقص حجم الدم)

* Aetiology :

Diminished Blood Volume due to ⤴

- ① Blood Loss : As in Haemorrhage.
- ② Plasma Loss : As in Burn.
- ③ Fluid Loss : As in Severe Vomiting & Diarrhoea.

* Physiological Response :

[Haemorrhage is the Classic Example of Hypovolaemic Shock] There are 2 Aims

Ⓐ Stopping the Bleeding "Local Factors"

- By ① Immediate Vasoconstriction.
 ② Retraction of intima of bleeding vessels.
 ③ Subsequent Clot formation.

Ⓑ Maintaining effective Circulatory Volume "General Factors"

By ① Neural Factors : Stimulation of the Sympathetic System, Leading to ⤴

- Constrictions of Veins So displaces the blood to the Heart.
- Constrictions of Arterioles So raise the peripheral resistance.
- Increasing Rate & strength of cardiac contraction.

② Endocrinal Factors : Mediated through the following Mechanisms ⤴

- Catecholamines → ↑ HR & Myocardial Contraction then constriction of arterioles of skin & viscera.
- ↑ ADH, Aldosterone & Renin-Angiotensin system → ↑ Na & water retention So correct the blood volume.
- ↑ ACTH, Cortisol, GH & Glucagon → Hyperglycaemia which increases Extracellular Fluid (E.C.F) So correct the blood volume

③ Other Mechanism to correct R.B.Cs

↓ O₂ → ++ Kidney → ↑ Erythropoietin → ↑ RBCs.

* Clinical Picture :

[Haemorrhage is the Classic Example of Hypovolaemic Shock] →

(A) Symptoms

- (a) Weakness & Fainting especially with standing.
- (b) The patient feels Cold.
- (c) There is Thirst Sensation.

(B) Signs "Patients vary from Anxious to Restlessness to Drowsy" to unconsciousness

(a) Pulse : (Rapid & Weak)

- Due to ① $\uparrow$ Catecholamines $\rightarrow$ Direct stimulation of [S.A. Node].
 ② $\downarrow$ O₂ (i.e. Hypoxia) $\rightarrow$ Direct stimulation of [C.A. Center].
 ③ Hypotension $\rightarrow$ Weak pulse.

(b) Arterial Blood Pressure : (Hypotension).

Because in Haemorrhage the venous Return decreases as a result of decreased Blood volume, and so the Cardiac output decreases $\rightarrow \downarrow$ A.B.P

(c) Temperature : (Subnormal).

Due to decreased metabolism.

(d) Respiratory Rate : (Tachypnea i.e. Air Hunger)

Due to $\rightarrow$ Hypoxia which stimulates Chemoreceptors in the [Carotid and Aortic bodies] $\rightarrow$ Stimulation of Respiratory Center (R.C).

(e) Skin : (Pale, Cold & Clammy).

Due to sympathetic overtone which

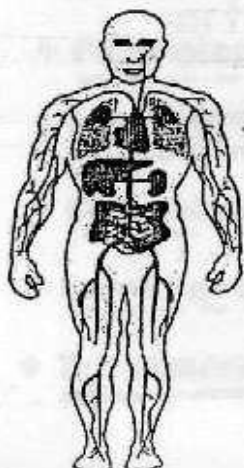
- leads to ① Vasoconstriction of Skin Capillaries i.e. Pale Skin.
 ② Vasoconstriction of Skin Arterioles i.e. Cold Skin.
 ③ Excessive sweating secretions i.e. Clammy Skin.

(f) Urine Output : (Oliguria)

- Due to ① $\uparrow$ ADH.
 ② $\downarrow$ Metabolic H₂O.
 ③ Renal Hypoperfusion.

* **IF** $\rightarrow$ The patient is rapidly treated by adequate volume replacement, these signs will rapidly return to normal

* **BUT IF** $\rightarrow$ The patient is not rapidly treated by adequate volume replacement, the followings will occur $\rightarrow$



- ◇ Lung : ARDS "Adult Respiratory Distress Sndrome".
- ◇ Heart : $\downarrow$ Myocardial Contractility by "T.N.F" Tumor Necrosis Factor released from Gut Hypoperfusion.
- ◇ Liver : Hepatic dysfunction & Jaundice from Liver Hypoperfusion.
- ◇ Kidney : $\downarrow$ GFR $\rightarrow$ Acute Tubular Necrosis $\rightarrow$ "A.R.F." Acute Renal Failure from Renal Hypoperfusion.
- ◇ Small Intestine : Release of depressing substances as Endotoxins from Gut hypoperfusion.

* Classes of Haemorrhage :

Parameter	Class I	Class II	Class III	Class IV
★ Blood loss	Up to 15% (750 ml)	15-30% (750-1500 mL)	30-40% (1500-2000 mL)	>40% (> 2000 mL)
★ Mental status	Normal to Anxious	Anxious to Restless	Restless to Drowsy	Drowsy to Unconscious
★ Capillary Refill	Normal	> 2 Sec.	> 2 Sec.	> 2 Sec.
★ Pulse/min.	90-100/ min.	100-120/min.	120-140/min.	> 140/min.
★ A.B.P.	Normal	Normal in supine only	Low	Low
★ Temperature	Normal	Cold	Colder	Very Cold
★ R.R	Normal	20-30/min.	30-35/min.	> 35/min.
★ Skin	Normal	Pale	Pale	Pale
★ Urine output	Normal >30mL/h.	30-20 mL/h.	20-10 mL/h.	10-0 mL/h.

* Investigations & Monitoring of Shocked pt. : "LC.U"

[The Aim is to Check the adequacy of Replacement]

- ① Pulse (Normally = 60 - 90/min), A. B. P. (Normally = 90-150/60-100), Respiratory Rate (Normally = 16-20/min.) and Temperature (Normally = 36.5 - 37.2).
- ② Central Venous Pressure (C.V.P) (Normally = 5 - 10 Cm H₂O)
- ③ Urinary output by Folly's Catheter.
- ④ Pulmonary Artery Wedge Pressure (PAWP) by "Swan Ganz" Catheter to estimate pulmonary artery pressure.
- ⑤ Hb %, Haematocrite value, Electrolytes, Urea & Creatinine.
- ⑥ Blood gases as PO₂ (Normally = 80 - 100 mmHg).
& PCO₂ (Normally = 35 - 45 mmHg).

N.B. : Irreversible Shock :

- It is a Complete Vascular Collapse with Hypotension unresponsive to volume replacement or drugs intervention.
- It is related to ↗
 - ① The Duration & Volume of Hge.
 - ② The Age of patient.
 - ③ The Fitness of patient.
- Before the conclusion that Irreversible shock has occurred,
The cause of unresponsive to therapy, may be due to ↗
 - ① Continuous Internal Blood loss.
 - ② Inadequate Volume Replacement.
 - ③ Acute Myocardial Insufficiency.

* Treatment :

[Haemorrhage is the Classic Example of Hypovolaemic shock]

[A] Stop of Bleeding

• 1ry Haemorrhage :

- ① Proximal pressure is applied over the artery against bone.
- ② Cover the wound by clean dressing i.e. Packing then Positioning.

N.B.: Tourniquets are contraindicated because of it's complications unless the limb is going to be amputated.

- ③ Operative procedures, through control of bleeding points by ligation or diathermy coagulation.

• Reactionary Haemorrhage :

Re-exploration & control the bleeding as above.

• 2ry Haemorrhage :

- ① The wound is packed with A.B & Sterile dressing.
- ② Antibiotics are given systematically.
- ③ If the bleeding is not controlled by that ways. Do re-exploration of the wound & ligate the bleeding vessels in the wound itself.

[B] Restore the Blood Volume "Depending on the Classes"

• Class II Haemorrhage (15 – 30% Bl. Loss)

- ① The Replacement solution is [Ringer's Lactat].
- ② The amount is 3 Times the estimated deficient blood i.e about 3 liters.
- ③ The Administration : [2 liters] are given as a bolus and the response is monitored. Then if there is definite improvement the remaining [1 liter] is given more slowly.

N.B. : If Haematocrite value < 30 → Bl. Transfusion is required

• Class III (30-40% Bl. Loss) & Class IV (> 40% Bl. Loss) :

- ① Start with blood transfusion as replacement therapy.
- ② The Amount is Equal the estimated deficient.
- ③ The Administration The Transfusion is continued till recovery but if no improvement search for Internal bleeding to be Aspirated Then continue the transfusion till recovery.

- Either Class II, III & IV : The restoration is guided by clinical progress, CVP, urine output, Haematocrite value etc...

[C] Other Procedures

- Positioning : Elevate both legs while maintaining the trunk of the patient in supine position.
- Analgesia : As Morphia but it is contraindicated with Head injuries or respiratory distress (Morphia → ↓ RC → ↑ CO₂ → Cerebral VD).
- Pulmonary Support : Oxygen is administrated the through a Face Mask, Nasal Catheter or Endotracheal Tube.

②

Septic Shock

* Incidence :

- The Most Serious type of shock & The Most Difficult to treat.
- The Mortality Rate > 30%.
- Gram -ve common than gram +ve, so it is called "Gram -ve Shock"

* Aetiology :

- Predisposing Factors :
 - ① Extremes of Age.
 - ② DM, Malnutrition, Malignancy or Uraemia.
 - ③ Patient under Corticosteroids or Immunosuppressive drugs.
- Source of Gram -ve Organism : "E. Coli, Klebsiella & Pseudomonas"
 - ① The Genito-urinary System.
 - ② The Elementary Tract & Biliary System.
 - ③ The Respiratory System.
- Common Causes :
 - ① Sepsis following operation of Genito-urinary, Intestinal Tract & Hepato-biliary especially when surgery is urgent.
 - ② Septic Peritonitis.
 - ③ Major Trauma or Burn with Sepsis.

* Pathophysiology : (مهم جداً)

[Gram -ve organism produce Endotoxins So Called "Endotoxide Shock"
These Endotoxins will stimulate the Macrophages to release "Cytokines"]

Which cause the following Problems

[A] Platelets & Leucocytes adherence to the Vascular Endothelium

Which leads to

- ① Impairment of microvascular perfusion i.e Microvascular thrombosis.
- ② More release of Cytokines & Oxygen free radicals leads to more damage to vascular endothelium.
- ③ Hypoxic Tissue damage.

[B] Damage of the Barrier Function of the Intestinal Mucosa :

Allowing passage of Intestinal Pathogens into the circulation → Toxaemia.

[C] Excessive production of "Nitric Oxide" by Vascular Endothelium.

Which is potent smooth muscles relaxant → peripheral vasodilatation → Aggravations of the shock.



Poor perfusion of vital organs leads to
Multi-organ failure i.e. Irreversible Septic Shock.

* Clinical Picture :

(A) Hyperdynamic (Warm) Septic Shock "The Early Stage"

- ① Vitally : HR "Tachycardia", A.B.P "Hypotension, Temp. $> 38^{\circ}\text{C}$ "Fever" & R.R. "Hyperventilation".
- ② Skin : Dry & Warm.
- ☛ Proper Treatment at this stage will survive.

(B) Hypodynamic (Cold) Septic Shock "The Late Stage"

- ① It follows : The above stage if not treated properly.
- ② The Clinical picture "Same as Hypovlaemic shock".
[↑ HR, Subnormal Temp., Hypotension & Hyperventilation + the skin is pale, Cold & Clammy + Oliguria]
- ☛ The End result is Multi-organ Failure.

* Causes of Death :

- ARDS "Adult Respiratory Distress Syndrome"
- Acute True Stress Ulcer.
- ARF "Acute Renal Failure".

* Investigations & Monitoring of shocked pt.: "As Hypovlaemic Shock" *

- Bacteriological Studies.
- Blood picture : Marked Leucocytosis.
- Location of septic source : By X-ray (Abdomen - Chest), U/S & CT scan.

* Treatment :

[It is better to treat these patients in (I.C.U) Intensive Care Unite]

- ① Immediate recognition and early eradications of the source of sepsis e.g. Resect gangrenous parts & Drain intra-abdominal Abscess.
- ② Antibiotics : The choice of drug depend on the possible suspected organism.

N.B. : A Combination of Cephalosporin, Amino glycosides & Metronidazole can cover all known organisms.

- ③ Correction of fluid imbalance by Ringer's Lactate, Plasma or Blood.
- ④ Oxygen mask or Mechanical ventilation if $\text{PO}_2 < 60 \text{ mmHg}$.
i.e. Adult Respiratory Distress Syndrome.
- ⑤ Anti-oxygen free Radicals as Allopurinol.
- ⑥ Drugs as
 - a. Vasopressors & Inotropics : if persistent Hypotension irrespective to the above mentioned measures.
 - b. Indomethacin & I.V. Corticosteroids :
to combat inflammatory mediators.

Frequent Monitoring by Pulse, A.B.P, Temp., R.R, Skin, Urine output, CVP, ECG, PAWP & Arterial Gases

3

Cardiogenic Shock*** Aetiology :**

Due to deficient Cardiac output despite a normal venous Return due to ⚡

- Acute Myocardial Infarction.
- Massive Pulmonary Embolism.
- Arrhythmia or cardiac Tamponade.

*** Characterized by :**

- Manifestation of the cause.
- Congested Neck veins.
- High C.V.P.

*** Treatment :**

- Treat the Cause.
- Drugs to improve Myocardial contractility e.g Inotropics.
- Vasodilators to ↓ after-load & ↑ Cardiac output.

4

Neurogenic Shock*** Aetiology :**

Due to paralysis of vasomotor fibers → Peripheral vasodilatation → Inadequate venous Return → ↓ Cardiac output. This occurs with ⚡

- ★ Vaso-vagal attack: due to hearing bad news leads to excessive vagal stimulation → Bradycardia → Hypotension.
- ★ High Transection of Spinal Cord : e.g. Spine fracture, or following spinal anaesthesia.

*** Characterized by :**

- Hypotension.
- Normal pulse or slight bradycardia.
- Warm skin.

*** Treatment :**

- The patient should be Flat with elevated legs.
- I.V Crystalloid solution as Ringer's Lactate.
- Vasopressors may be prescribed.

5

Anaphylactic Shock

- ★ This is due to capillary paralysis from histamine release. Corticosteroid are beneficial + Antihistaminic drugs.

6

Endocrinal Shock

- ★ This may occur in patients with Addison's disease or those receiving continuous Cortisone therapy.

IV Blood Transfusion

A

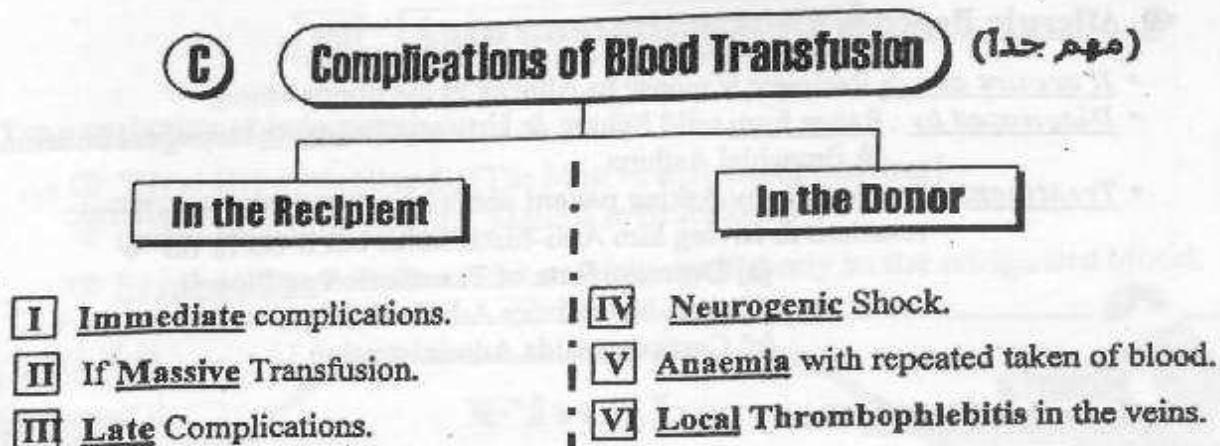
Precautions Before Blood Transfusion

- ① Blood should be warmed before Transfusion
to decrease the incidence of Hypothermia & Arrhythmia.
- ② Medication should never be add to blood used in Transfusions.
- ③ Fluid intended to precede or follows Blood Transfusion
should be isotonic without Calcium because (Ca^{++} will Clot Citrated blood).
- ④ Blood Left out of refrigerator for > 30 min should not be used.
- ⑤ Blood Typing (ABO) must be done.
- ⑥ Cross Matching Test is done.

B

Indications of Blood Transfusion

- ① Whole Blood : indicated to
 - *Correct blood volume* as in Hge Class III & IV.
 - *Correct any Internal Hge* during the operations.
 - *Replace infant's blood* with RH -ve in Erythroblastosis foetalis.
 - *Provide Antibodies & Raise the general condition* during severe infections.
 - *Provide Deficient Factors* as Factor VIII in Haemophilia A.
 - *Provide Deficient Factors* as Factor IX in Haemophilia B.
- ② Packed Red Cells :
 - *Very useful in anaemic patient especially* with Heart disease as it improve the oxygenation ability without over loading the circulation.
 - *Used in Haemolytic Diseases.*
 - *Used in Certain Diseases* as leukaemia.
- ③ White cells : used in
 - Leucopenia.
 - Agranulocytosis.
 - Aplastic Anaemia.
- ④ Plasma : used in
 - Burn.
 - Hypoproteinaemia.
 - Ascitis.
- ⑤ Platelets :
Used with Thrombocytopenia.
- ⑥ Coagulation factors :
Used with Haemostatic Disorders.



I Immediate Complications

① Overloading the Circulation "Heart Strain":

- It occurs with Heart disease or Anaemia which blood is given faster than the Heart can accept it.
- Diagnosed by [Lt. side HF + Acute Pulmonary Oedema].
- Treatment : It is recommended to Transfuse Packed red cells rather than the whole blood but if occur do
 - (a) Oxygenation.
 - (b) Patient is placed in semi-sitting position.
 - (c) Drugs : As Digitalis & Lasix.

② Haemolytic Reaction : Rare but Serious.

- It occurs in presence of Antibodies in the recipient plasma which destroy the donor's RBCs i.e. Haemolysis.

N.B. : Human Error is frequently involved in such accident

▪ Diagnosed by :

In the Conscious patient Chills, Fever, Flushing, Distended neck veins, Chest & Flank pain, Tachycardia, Hypotension, Tachypnea, Oliguria and Unexplained bleeding.

In the Anaesthetized patient Tachycardia, Hypotension and Unexplained bleeding.

In Major Haemolytic Reactions Jaundice, ARF & Haemoglobinuria.

- Treatment : (a) Stop the infusion Immediately Then Repeat Typing.
- (b) I.V Ringer's lactate + Manitol to wash kidney.
- (c) Oxygenation.

③ Pyrogenic Reaction :

- It occurs due to minor bacterial contamination or some of pyrogens in the Transfusion apparatus.
- Diagnosed by : Chills & [Fever, Headache, Malaise & Anorexia].
- Prophylaxis is the main treatment.

④ **Allergic Reaction :**

- It occurs due to Recipient response to Allergy in the donor blood.
- Diagnosed by : Range from mild Itching & Urticaria to severe laryngeal oedema & Bronchial Asthma.
- Treatment : Prophylactic by Asking patient about histories of severe allergic reactions & Giving him Anti-histaminics but if occur do
(a) Decrease Rate of Transfusion or Stop it.
(b) Anti-histaminics Administration.
(c) Corticosteroids Administration

⑤ **Thrombophlebitis (Rare)**

⑥ **Air Embolism (Rare) :**

- It occurs From blood Transfusion under pressure applied to it's surface.
- Diagnosed by : Mill-wheel Murmur & ECG changes.
- Treatment : Place the patient on the Lt. side with Head down to trap the air bubbles in Rt. ventricle & Keep them away from the pulmonary outflow.

II Complications Due to Massive Blood Transfusion

[Massive = Transfusion of 2500 mL of blood at one time]

① **Danger of Cold blood :** Hypothermia & Cardiac arrhythmia

② **Citrate Toxicity :**

- It occurs in patient with Liver disease or in shock. The liver cannot metabolise Citrate. Increased citrate will combine with Ca^{++} → Hypocalcaemia.
- Diagnosed by : Tetanic manifestations.
- Treatment : Administration of 10cc (10%) Ca Gluconate.

③ **Metabolic Acidosis :**

The PH of 14 days banked blood = 6.7 - 6.9

So because of hypoxic RBCs → Anaerobic Metabolism → ↑ Lactic Acid.

④ **Coagulopathies :**

Due to deficiency of Coagulation factors & Platelets in stored blood.

⑤ **Hyperkalaemia :**

With prolonged storage of blood there is progressive loss of Potassium from R.B.Cs into plasma. So with blood transfusion several units of these potassium may produce Arrhythmia or even Cardiac arrest.

⑥ **Pulmonary Complications :**

Due to accumulation of Unfilterable debris of clot present in (stored blood) → Pulmonary Micro-emboli.

III

Late Complications

Transmission of Infections :

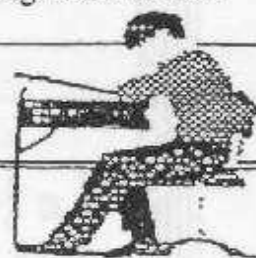
As ① Viral Hepatitis (B or C) [The Most Feared Complication]

② AIDS Infection, Syphilis, Malaria & Brucellosis.

③ Septicaemia: Bacteria cannot multiply significantly in the refrigerated blood.



Final Written Exams



- | | | |
|------|--|---|
| 1994 | <ul style="list-style-type: none"> • Discuss Indications, Complications of <u>Blood Transfusion</u> & ttt of each Complications. • Discuss Aetiology & Types of Shock. Then Describe C/P of <u>Hypovolaemic shock</u>. | (25 Marks) دور ثانی
(20 Marks) |
| 1995 | <ul style="list-style-type: none"> • Discuss Complications of <u>Blood Transfusion</u> | (20 Marks) دور ثانی |
| 1996 | <ul style="list-style-type: none"> • Discuss Complications of <u>Blood Transfusion</u> | (15 Marks) |
| 1997 | <ul style="list-style-type: none"> • Discuss Complications of <u>Blood Transfusion</u> • Discuss <u>Hypovolaemic shock</u>: pathophysiology and management | (10 Marks)
(15 Marks) دور ثانی |
| 1998 | <ul style="list-style-type: none"> • Discuss C/P & ttt of <u>Septic Shock</u> • Classifications & management of <u>Wounds</u> | (10 Marks) دور ثانی
(15 Marks) |
| 1999 | <ul style="list-style-type: none"> • Discuss Complications of <u>Blood Transfusion</u> • Discuss management of severely injured patient • Discuss Aetiology and management of Hypovolaemic shock. | (10 Marks) دور ثانی
(10 Marks)
(10 Marks) |
| 2000 | <ul style="list-style-type: none"> • Discuss Types of wounds & management of open wounds. • Discuss Factors affecting wound healing | (15 Marks) دور ثانی
(10 Marks) |
| 2001 | <ul style="list-style-type: none"> • Discuss septic shock • Mention Indication & complications of blood transfusion | (20 Marks)
(10 Marks) |
| 2002 | <ul style="list-style-type: none"> • Discuss post-haemorrhagic shock • Mention factors affecting wound healing • Discuss priorities in management of multi-injured patient. • Discuss complications of blood transfusion • Discuss aetiology, C/P of septic shock | (10 Marks) دور ثانی
(12 Marks)
(12 Marks)
(12 Marks)
(12 Marks) |
| 2003 | <ul style="list-style-type: none"> • Enumerate factors of abdominal wound dehiscence (Burst Abdomen) | (12 Marks) دور ثانی |
| 2004 | <ul style="list-style-type: none"> • Discuss factors affects wound healing | (20 Marks) دور ثانی |

Chapter [2]

The Burns & Principles of Plastic surgery

Chapter [2]

I Burns

* **Definition :** Coagulative destruction of Tissues.

* **Aetiology :**

① **Physical Burns :**

- **Thermal :** Exposure to Flame.
N.B. : A Scald caused by boiled liquids.
- **Electric :** Burn due to Electricity.
- Exposure to **Irradiations**.

② **Chemical Burns :**

- Acids or Alkalis.
- Corrosives as **Potash**.
- Caustics.

③ **Inhalation Burns :** Due to Exposure to Hot gases.

* **Classification : [PATHOLOGY]**

① **According to the Percentage surface area involved**

* **Rule of [9]** So Classified into

- **Major Burn :** > 30% of **Body Surface Area (B.S.A)**
- **Intermediate Burn :**
(15 – 30% in Adult & 10 – 30% in Children).
- **Minor Burn :**
(< 15% in Adult & < 10% in Children).

★ Head & Neck = 9%	★ Front of Trunk = 18%
★ Each upper limb = 9%	★ Back of Trunk = 18%
★ Each lower limb = 18%	★ Perineum = 1%

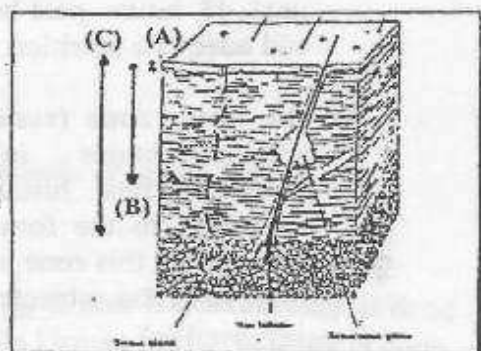
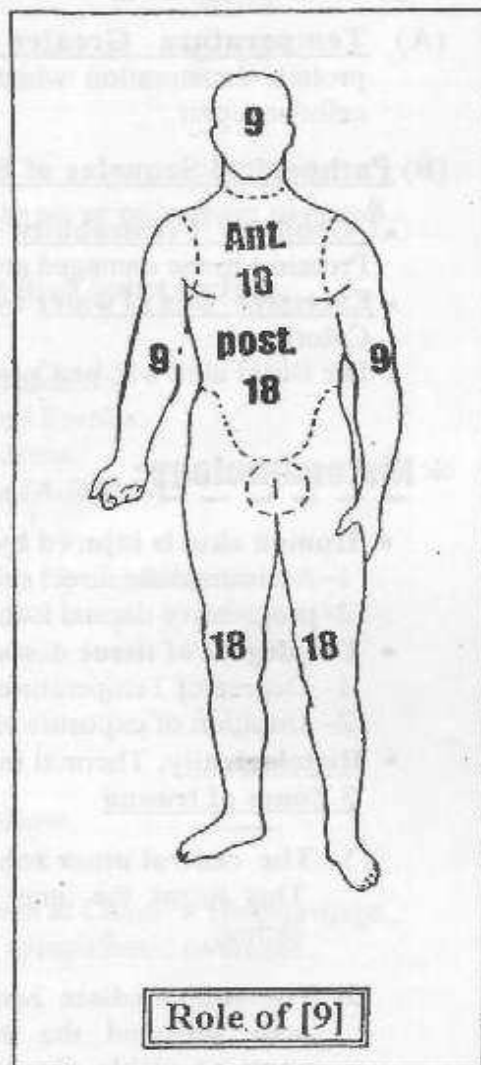
② **According to Depth**

(A) **First degree Burns:**

Only the **epidermis** is damaged causing erythema of skin. So they heal rapidly e.g. sun burns

(B) **Second degree Burns:**

- The **epidermis & portion of dermis** are damaged
Provided that No infection, the Healing occur by epithelialization from the epithelial remnants of Hair follicle & Sweat gland. But if infection occurs. These epithelial remnants will destroyed and so changed to be a full Thickness Burn.
- **This degree is subdivided into :**
 - (1) **Superficial partial thickness burn :**
Which usually heal in 10-14 days.
 - (2) **Deep partial thickness burn :**
Which usually heal in 25-35 days .



(C) Third degree (Full Thickness) burns:

This is a complete destruction of epidermis + dermis & the patient should be prepared for grafting .

③ According to Site of Burn :

e.g. Burn in perineum is difficult to nurse.

*** Pathophysiology :**

(A) Temperature Greater than 45°C Results in protein denaturation which exceeds the capacity of cellular repair .

(B) Pathological Sequelae of Burns

- ↑ Capillary Permeability leads to loss of (Fluid & Protein) in the damaged area.
- Excessive loss of water by Evaporation with loss of Calories.
- The Burnt area will be Colonized by Bacteria.

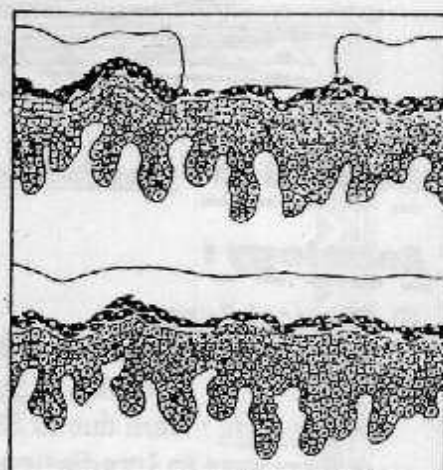
*** Histopathology :**

- Human skin is injured by heat in two ways :
 - 1- An immediate direct cellular injury .
 - 2- progressive dermal ischaemia .
- The degree of tissue destruction is related to :
 - 1- Degree of Temperature .
 - 2- Duration of exposure to the heat source.
- Histologically, Thermal injury to the skin results in 3 Zones of trauma

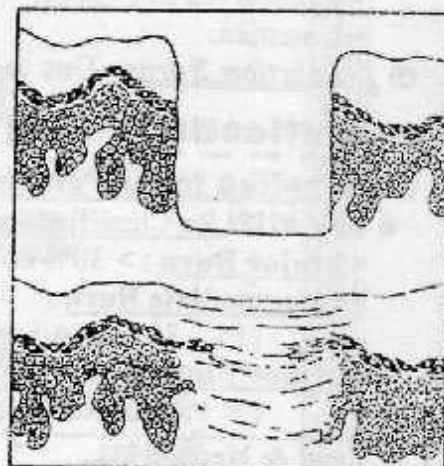
1- The central inner zone (zone of coagulation).
This forms the inner layer of the visible burn eschar.

2- The intermediate zone (zone of stasis). This area surround the zone of coagulation. It contains viable tissues that may die over the next 48 hours post-burn, if tissue oxygenation and adequate nutrition are not maintained.

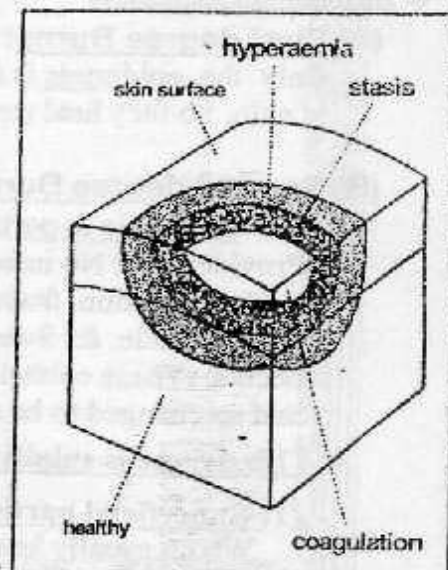
3- The outer zone (zone of hyperaemia). This area contains inflammatory mediators (prostaglandins, histamine and kinins), which contribute to the formation of tissue oedema. Tissues in this zone normally recover within 7-10 days unless subjected to infection.



Superficial burns heal by epithelialization.



Deep burns heal by fibrosis and scarring.



Histological burn zones

* Clinical Picture :

- ① Pain : sever with superficial burn & little with deep burn.
- ② Acute Anxiety : The patient is often severely distressed.
- ③ Dehydration : From fluid and plasma loss.
- ④ Local tissue oedema : May leads to airway obstruction.
- ⑤ Coma : Following major burn.

* D.D. : Between partial & full thickness burn See later

* Complications :

① General Complications

① Shock

- Neurogenic : Immediately after burn due to sever pain from exposed nerve endings.
- Hypovolaemic : 1st 48h due to plasma loss from burnt surface.
- Septic : After one week from infection.

② Respiratory System : Especially with Inhaled Burn.

- Asphaxia & Laryngeal oedema from inhaled Smoke.
- Pneumonia, Emphysema & Pulmonary oedema.
- Finally Adult Respiratory Distress Syndrome (A.R.D.S)

③ Cardio-vascular System

- Anaemia.
- ↓ Cardiac output up to 50%.
- Hypoproteinaemia.

④ Renal System

- Oliguria from Renal Hypoperfusion.
- Fluid & Electrolytes Imbalance.
- Finally Acute Renal Failure (ARF) may follow.

⑤ G.I.T. System

- Acute True Stress Ulcer of Stomach, Duodenum & Colon → Haemorrhage.
- Acute gastric dilatation from Toxaemia and sympathetic overtone.
- Paralytic Ileus.

⑥ Endocrinal System

- ↑ Catecholamine from stress.
- ↑ Cortisol secretions.
- ↑ A.D.H.

② Local Complications

- ① Infection : Due to Bacterial Colonization → Septicaemia or Septic Shock.
- ② Scar : Hypertrophic or keloid formation.
- ③ Contractures across joints.

- ④ Burns in Face & Neck → Oedema & Suffocation So Urgent **Tracheostomy** is done
- ⑤ Burns in Limb & Chest → Constricting Eschars So Urgent **Escharectomy** is done
- ⑥ Burns in Perineum → Reflex urine retention So Urinary Catheter is inserted.

* Management of Burns :

(A) 1st Aid Treatment "Pre-hospital Care"

- ① Ensure of patent "Airway" if patient is unconscious.
- ② Burn is washed with saline or tap water to decrease pain
- ③ Sterile dressing to prevent contamination.
- ④ Analgesic for pain.
- ⑤ Immobilize the fractured part if associated.
- ⑥ Transfer to Hospital.

(B) Definitive Treatment "Hospital Care"

- ① Assessment of Burn "Minor, Intermediate or Major"
 - ② 4 Anti [Antishock, Antibiotics, Antitetanic Serum & Anti-gas Gangrene].
- Then it is very important to Differentiate between ↗

	Partial Thickness Burns	Full Thickness Burns
• <u>Appearance</u> :	▪ Moist "Due to exudated plasma".	▪ <u>Dry</u> .
• <u>Pain</u> :	▪ Very painful.	▪ Painless.
• <u>Pin prike Test</u> :	▪ <u>+ve</u> "Pin Prike Test"	▪ <u>-ve</u> "Pin Prike Test"



Then According to the Assessment there are "2 Possibilities"

IF Minor Burns No Hospitalization but ↗

- ① Wash of Burnt area with saline.
- ② Puncture of Vesicles.
- ③ Remove Necrotic Epithelium.
- ④ Clean with Anti-septic solution (Savlon or Betadine).
- ⑤ Apply Silver sulphadiazine Ointment + Dressing with vaseline Gauze.
- ⑥ Leave it for 2 weeks until healing.

IF Intermediate or Major Burns

★ General Treatment

- [I] - Resuscitation & Prevention of Shock.
- [II] - Resuscitative fluid therapy.
- [III] - Nutritional care.

1) Resuscitation & Prevention of Shock.

- Ensure patent "Airway" by Endotracheal Tube if Smoke is inhaled.
- Elevate the foot of patient to ↑ Venous Return.
- 3 Tubes : Ryle Tube for suction, Foley's Catheter and A wide bore I.V Cannula is inserted rapidly for fluid therapy or Venous Cut Down.

III Resuscitative Fluid Therapy مهم جدا

Evan's Formula

- ★ **1st Day** : (1 mL/Kg Normal Saline X % Burn).
 + (1 mL/Kg colloid "Plasma or Blood" X % Burn).
 + (2000 CC Glucose) for Caloric requirement.
- ★ **2nd Day** : (0.5 mL/Kg Normal Saline X % Burn)
 + (0.5 mL/Kg Colloid, "Plasma or Blood" X % Burn).
 + (2000 C.C Glucose) for Caloric requirement.

Parkland's Formula

4ml/kg Ringer's lactate × % Burn per day

Parkland Formula of Fluid Resuscitation

4 cc's of
Lactated
Ringer's

per percent
TBSA burn

per kg. of
body weight

1/2 of total in first 8 hours
1/4 in second 8 hours
1/4 in third 8 hours

- N.B.**
- ① In all Formula, The Maximum percentage of burn calculated is 50%, otherwise serious over-perfusion occur.
 - ② Half of the above calculated amount is given during 1st 8 hours then ¼ at next 8 hours then ¼ at next 8 hours.
 - ③ How to judge the adequacy for resuscitation?
 - A) Regular follow up of vital signs.
 - b) The urine output should be 30-60 ml/hour.
 - c) C.V.P in Critical cases.

IIII Nutritional Care "At 3rd Day"

1st 48 hours (No) oral feeding to avoid vomiting. After that period (At 3rd Day) patient can tolerate oral intake of fluid, diet rich in vitamins & Iron should be Given.

★ Local Treatment

- [I] - Early Excision.
- [II] - The Exposure (Opened) Method.
- [III] - The Occlusive (Closed) Method.

[I] Early Excision

- © In (Full Thickness) Burn : Excision of burnt tissues + Covering by suitable Skin Graft.
- © In Circumferential Burn : With constricting Eschar as chest & Limb
So Linear Excision is indicated i.e. **Escharectomy**.

III The Exposure (Opened) Method :

- **Technique** : The Exposure requires isolation of the patient in completely Aseptic atmosphere.
- **Indicated with** : ① Burns in the Face & Neck.
② Burns involving one side of Trunk.
③ Burns in the perineum.
- **Advantages** : ① More Comfortable to patient.
② Avoid Repeated dressing.
③ ↓ Bacterial growth by Surrounding Dry Air.

IIII The Occlusive (Closed) Method :

- **Technique** : By ① Clean the burnt area with Aseptic solution.
② Apply Silver Sulphadiazine Ointment.
③ Dressing by Vaseline Gauze.

N.B. : In Occlusive Method a special Tube will be used "Hubbard Tank" for dressing changes or Anaesthesia especially in (children) since it is usually painful.

- **Indicated with** : ① Circumferential Burns.
② Burns in the Hand.
③ Burns in the Limbs.
- **Advantages** : ① ↓ Fluid loss by Evaporation.
② ↓ Oedema of Tissues by compression.
③ ↓ Pain by covering exposed nerves.

N.B. Management of special sites of burn

- ① Head & Neck : I.V steroid to decrease laryngeal oedema ± tracheostomy.
- ② Perineal burn : Insertion of urinary catheter to avoid reflex urine retention.

Later on

Full thickness burns will require closure by skin graft:

1. Autologous skin grafting :

Thiersch grafts are commonly used.

2. Biological dressings:

- **Indicated** : If Autograft are not enough .
- **Examples**: (1) Allograft (Cadaver's Skin).
(2) Xenograft (Pig's Skin).
(3) Amniotic membrane .
- **These grafts are Temporary**.

3. Prevention of contractors:

Through immobilization in the best functioning position and physiotherapy.

Special Types of Burns

Electric burns (A form of thermal injury):

- Tissue damage is due to the passage of the electric current through blood and bones.
- Severity of the burn: It is divided into high and low tension injuries according to the voltage responsible for the injury.
- The affected blood vessels usually show late thrombosis with delayed progressive ischaemic necrosis at different sites.

(2) Chemical burns

- Tissue damage is due to corrosive or potash.
- Severity of the burn: is determined by the strength of the agent, its amount, duration of skin contact and its mechanism of action.
- Management: (1) Systemic control by administering the proper antidote
(2) Locally: the affected areas irrigated with massive amounts of water.

(3) Cold injury (A form of thermal injury):

- Tissue damage is due to: Frost bite
- Severity of the burn depends on the duration of exposure & degree of coldness.
- This types usually affects hands, feet, ears and nose.

(4) Inhalation burn

- Tissue damage is due to: hot gases. & suspected in the followings :
Facial burns, Burnt nasal hairs and closed space burns.
- The severity of the burn depends on site of affection
 - Upper respiratory tract → laryngeal oedema.
 - Lower respiratory tract → pneumonia.
- Management = Early intubations with high flow oxygen.

II Principles of Plastic Surgery

I Skin Grafting

* Definition :

A segment of skin, including (The Epidermis & Variable thickness of Dermis) separated from it's blood supply in donor area and then transplanted to raw recipient area.

* Aetiology :

- Burns.
- Trauma
- Follow Surgical resection of Tumors.

*** Factors affecting the survival of skin graft :**

- The Vascularity of the recipient area.
- Graft Thickness : The Thinner is the Better.
- Graft Size : The Smaller is the Better.

*** D.D :**

	Split Thickness "Thiersch Graft"	Full Thickness "Wolfe Graft"
★ Include	Epidermis & <u>part of</u> Dermis	Epidermis & <u>whole</u> Dermis
★ Advantages	• <u>Good</u> intake. • Donor sites heal <u>spontaneously</u>.	• Cosmetically <u>Better</u>. • <u>Better</u> sensation. • Resist to Trauma <u>strongly</u>. • <u>Minimum</u> contracture.
★ Disadvantages	• Cosmetically <u>Poor</u>. • <u>Poor</u> sensation. • Resist to Trauma <u>weakly</u>. • <u>Maximum</u> Contracture.	• <u>Bad</u> intake. • Donor sites must be <u>Closed Surgically</u>.

II Skin Flaps

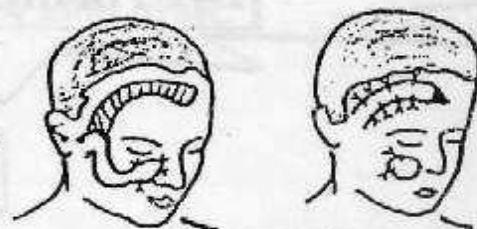
*** Definition :**

Tissue Transferred from one side of the body to another area but attached to it's original site by a pedicle through which it receives blood supply.

*** Types :**

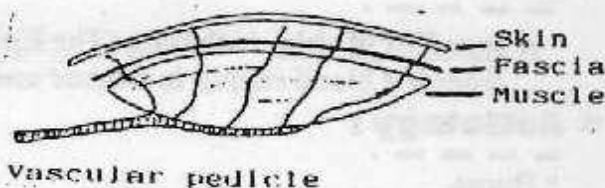
(1) Skin Flaps:

- Random Pattern Flaps: have no anatomically recognized blood supply, so it should have a length: width 2:1
- Axial Pattern Flaps: are supplied by a known artery & have no limitation as regard The length:width ratio, so they have a wider area for rotation e.g Forehead Flap based on superficial temporal artery



(2) Myocutaneous Flaps:

They are Flaps receive their blood supply from underlying muscle. e.g Pectoralis major myocutaneous flap in head & neck.



(3) Fascio-cutaneous Flaps:

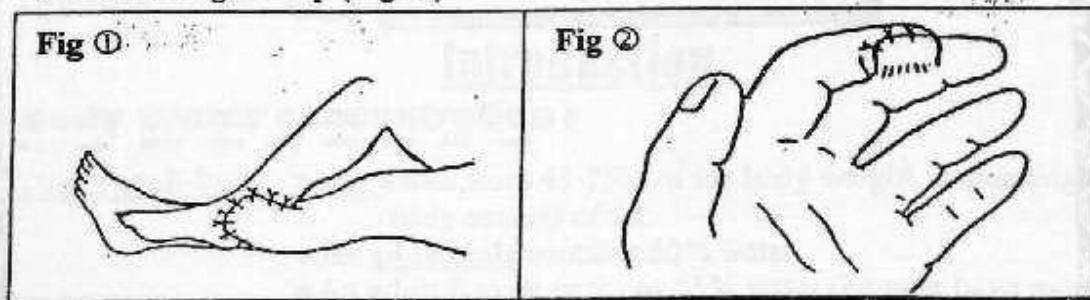
To avoid the functional deficit of muscle transference & the bulky Flap.

(4) Distant pedicle Flaps:

These keep the recipient site attached to the donor site by a pedicle for 2-3 weeks in order to allow neovascularization, before separating the base from the donor site.

e.g Cross leg Flap (Fig ①)

Or Cross finger Flap (Fig ②)



(5) Microvascular Free flaps:

Transfere a flap totally by microvascular anastomoses of it's artery & vein to a new vessels at recipient area.



**Final
Written Exams**



- | | | |
|------|--|-----------------------------------|
| 1989 | • Discuss Complications of <u>Burn</u> | (25 Marks) |
| 1993 | • Discuss Complications of <u>Burn</u> | (19 Marks) |
| 1994 | • Discuss Treatment of 30% surface Area <u>Burn</u> | (20 Marks) |
| 1995 | • Discuss the <u>Fluid therapy</u> in 25% surface area "Acute superficial burn" in adult patient as regards (the amount of fluid, the types of fluid & The Timing of therapy). | (15 Marks) |
| 1996 | • Discuss Complications of <u>Deep Major Burn</u> . | (15 Marks) |
| 1997 | • Discuss Management of 35% <u>Major Burn</u> of head, neck & trunk. | (10 Marks) دور ثانی |
| 1999 | • Discuss Complications of <u>Burns</u> | (10 Marks) |
| 2000 | • Discuss Classifications of burns according to surface area & depth | (10 Marks) دور ثانی |
| 2001 | • Discuss complications of Burn | (10 Marks) |
| 2002 | • Discuss complications of Burn.
• Mention fluid therapy of 30% burn in adult | (10 Marks) دور ثانی
(12 Marks) |
| 2003 | • What are the complications of burns. | (20 Marks) |

Chapter [3]

Water, Electrolyte Imbalance & Acid- base Regulation

Chapter [3]

Water, Electrolyte Imbalance & Acid-Base Regulation

I

Water Imbalance

Introduction

* Body water concentration :

The Total body water varies from 45-75% of the body weight, depending on the body content of fat.

- An adult male contains 60% water.
- An adult female contains 55% water (Female have more fat).
- A newborn or infant has 75% water.

* Body water divisions :

The Total body water is divided into two compartments.

(1) The intracellular compartment represents water inside the cells (40% of body weight.)

(2) The extracellular compartment represents water outside the cells (20% of body weight) which is divided into

- The interstitial compartment (15% of body weight).
- The intravascular compartment which is the plasma (5% of body weight).

* Sources of Body Water:

[A] Exogenous: e.g Water intake.

[B] Endogenous e.g Metabolic water.

* Normal Water balance :

[A] Water Input = sources i.e Exogenous or Endogenous.

[B] Water Output = ① Lung: Controlled by respiratory rate.

② Skin: Controlled by climate condition.

③ Feces: ↑↑ with diarrhoea

④ Urine: Controlled by blood volume.

Input (ml)	Volume	Output (ml)	Volume
Drink	1500	Urine	1500
Food	800	Feces	100
Metabolic	200	Lungs	400
		Skin	500
Total	2500	Total	2500

- * Abnormal water balance: ① ↓↓ Water depletion (Pure Dehydration)
or ② Water Excess ↑↑ (Water Intoxication)

	(A) Water Depletion (Pure Dehydration)	(B) Water Excess (Water Intoxication)
* Causes :	① <u>↓ Intake</u> : as difficulty of swallow or comatosed patient. ② <u>↑ Loss</u> : as in Fever & uses of osmotic diuresis. ③ <u>Unreplaced Losses</u> : as ↑ loss From lungs after tracheostomy.	① <u>↑ Administration</u> of electrolyte free water to Na depleted patient. ② <u>Over-infusion</u> of 5% glucose to post-operative patient. ③ <u>↑ Intake</u> as neurosis. ④ <u>Colo-rectal washout</u> by water Enema instead of saline
* Pathology :	If water $\downarrow\downarrow \rightarrow \downarrow$ volume & $\uparrow$ osmolarity $\rightarrow \uparrow$ ADH & <u>Finally</u> $\uparrow$ water resorption from kidney.	If water $\uparrow\uparrow \rightarrow \uparrow$ volume & $\downarrow$ osmolarity $\rightarrow \downarrow$ ADH & <u>Finally</u> $\downarrow$ water excretion by kidney.
* C/P :	① Thirst & Weaknes. ② $\downarrow$ Tissue Tugor. ③ <u>Oliguria</u> with $\downarrow$ specific gravity of urine.	[A] <u>Moderate (Water Excess)</u> - $\uparrow$ Urine volume. - $\uparrow$ body weight. - $\downarrow$ Serum Na^+ Concentration. - $\downarrow$ Haematocrite Value. [B] <u>Marked (Water Excess)</u> - Brain oedema $\rightarrow$ from drowsy to convulsions up to coma. - Nausia & vomiting of clear fluid.
* Treatment :	<u>Either ① or ②</u> $\rightarrow$ ① <u>Replaced the difcilt</u> by equall volume of Na free water <u>But If</u> severe Depletion at least $\frac{1}{2}$ the estimated deficit replaced over 12h. ② <u>Replaced</u> by I.V glucose 5%.	<u>According to</u> $\rightarrow$ ① <u>Moderate</u> : only restriction of water intake. ② <u>Marked</u> : forced diuresis by Manitol <u>But If</u> ● Renal failure $\rightarrow$ Dialysis. ● Convulsion $\rightarrow$ 100-250 cc I.V 5% Nacl solution

II

Electrolyte Imbalance

Introduction*** The Level of cations & Anions In ECF :**

Cations	mmol/L	Anions	mmol/L
Na^+	140	Cl^-	105
K^+	5	HCO_3^-	25
Total	145	Total	130

* The chemical composition of body fluid compartments :

Intracellular fluid		Plasma	
Cations	Anions	Cations	Anions
K ⁺ 150	PO ₄ 150	Na ⁺ 142	CL ⁻ 103
Mg ⁺ 40	SO ₄	K ⁺ 4	HCO ₃ 27
	HW 3-10		SO ₄ 3
Na ⁺ 10	Proteins 40	Ca ⁺ 5	PO ₄
		Mg ⁺ 3	Proteins 16
			Organic Acids 5
200	200	154	154

* The Most Important cations ↗

Na⁺

- It is the main Extra cellular cations.
- Total body Na⁺
ECF 44%.
ICF 9%.
Bone 47%

K⁺

- It is the main Extra cellular cations.
- 75% of Total body K⁺
Is found in skeletal Muscle.

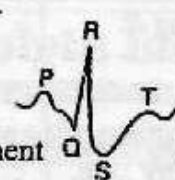
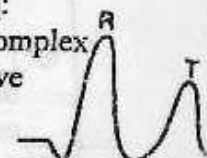
NOW

We will study ↗

Na⁺ Imbalance = Hyponatremia i.e ↓ Na⁺
& Hypernatremia i.e ↑ Na⁺
K⁺ Imbalance = Hypokalaemia i.e ↓ K⁺
& Hyperkalaemia i.e ↑ K⁺

	Hyponatremia (i.e ↓ Na ⁺)	Hypernatremia (i.e ↑ Na ⁺)
* <u>Causes :</u>	① <u>G.I.T. Loss :</u> as suction vomiting & diarrhoea. ② <u>↑ Na loss in urine:</u> occur with renal failure, salt losing Nephropathy ..etc. ③ <u>E.C.F. loss :</u> • Externally with burns • Internally (3rd space loss) e.g peritonitis, ascites, tissue oedema...etc. ④ Hypovolaemia. ⑤ Adrenocortical insufficiency ⑥ Restricted Na⁺ in diet.	① <u>Excessive saline</u> transfusion in the early post-operative. Period. ② <u>↑ Na⁺ resorption</u> with ↑ (Aldosteron or Cortison) ③ <u>Inability to excrete Na⁺</u> with sever illness starvation. ④ <u>Abnormal renal retention</u> of Na⁺ with Heart or liver failure

* <u>C/P</u> :	[Mainly due to ↓ ECF volume] ① Sunken <u>eyes</u> & depressed fontanelle in infants. ② Dry coated <u>Tongue</u>. ③ Dry wrinkled <u>skin</u> & Lax S.C tissue. ④ Collapsed <u>skin veins</u>. ⑤ Hypovolaemia → Tachycardia, Hypotension & shock. ⑥ ↓↓ C.V.P ⑦ Oliguria.	① <u>Slight Puffiness</u> of the face as early signs. ② <u>The only reliable cardinal sign</u> of ↑↑ total body Na^+ is oedema & ascites ☹  ③ Weight gain. ④ Hypertension.
* <u>ttt</u> :	① <u>Replacement</u> by normal saline (NaCl 0.9%) or Ringer's lactate (NaCl + K^+ + lactate). ② <u>If Associated blood loss</u>, Blood transfusion is given.	① Na^+ restriction in diet. ② Careful use of diurestics. ③ <u>If oedema with Hypoproteinaemia</u> protein must be corrected 1st.

	Hypokalaemia i.e ↓ K^+	Hyper Kalaemia i.e ↑ K^+
* <u>Causes</u> :	① <u>Vomiting</u>: e.g pyloric obstruction. ② <u>Severe Diarrhae</u> e.g ulcerative colitis. ③ <u>External GIT fistula</u>. ④ <u>K^+ Losing diuretics</u> e.g Furosemide ⑤ <u>Alkalosis</u> i.e Intra-cellular shift of K^+	① Renal Failure. ② Acidosis. ③ <u>Diabetics</u> with reduced insulin secretion.
* <u>C/P</u> :	① <u>Early signs</u> are vague as malaise & weakness ② Paralytic Ileus & distention ③ ± Cardiac arrhythmia. ④ <u>ECG Changes</u>: ♦ Prolonged Q-T Interval. ♦ depressed ST segment ♦ inverted T wave 	① ↑ cell excitability for muscle & nerves. ② Hypotention. ③ ± Cardiac arrhythmia. ④ <u>ECG changes</u>: ♦ wide QRS complex ♦ Peaked Twave 
* <u>ttt</u> :	<u>Estimation of K^+ deficit</u>, can be obtained from the total body K^+ capacity, Blood PH & Serum K^+ level. <u>N.B:</u> It should be consider that K^+ is dangerous as Hyperkalaemia so it must be ginen slow I.V infusion.	① <u>I.V Ca gluconates</u>: as ca antagonized K^+. ② <u>I.V Na HCO_3</u> → Alkalsis → Intracellular K^+ shift. ③ <u>20 gm glucose</u> + 10 unites regular insulin infusion. (Glucose is give to prevent polyglycaemia).

III Acid - Base Regulation

Physiological Considerations

- An Acid = is a Hydrogen ion (H^+) donor.
- A Base = is a Hydrogen ion (H^+) accept.

So

Through out life,

The body produces (H^+) & they must be either excreted or buffered to keep the PH of internal environment constant at a range of [7.3-7.5]

So

Mechansisms of PH Regulation are ⇨

[A] Body Buffer system:

Consists of weak Acide & Bases dividid into (Bicarbonate, Haemoglobin, Tissues & Bone)

[B] Renal mechanism:

- Resorbing filtered HCO_3^- preventing it's loss in urine.
- Excreting (50-100 mEq) H^+ /day.

[C] Respiratory mechanisms:

Through elimination of CO_2 generated by following equilibrium
 $HCO_3^- + H^+ \rightarrow H_2O + CO_2$

A

Metabolic Acidosis

* Definition:

This is a condition where there is a base deficit or acid excess other than HCO_3^-

* Aetiology:

[A] Over production of an organic acid: Which occurs in ⇨

- ① Diabetic ketoacidosis.
- ② Lactic acidosis of anerobic sepsis, shock or ischaemia.
- ③ Salicylate toxicity or Hyperalimination due to excess amino acids.

[B] Impaired renal excretory mechanism: as in ⇨

- ① Acute Renal Failure
- ② Chronic Renal Failure
- ③ Renal Tubular Acidosis.

[c] Abnormal loss of bicarbonat: as in ⇨

- ① Diarrhae, pancreatic or small intestinal fistula.
- ② Uretero-sigmoid anastomosis.
- ③ Diamox (Acetazolamide) therapy.

★ Diagnosis:

- ① Nausea, Vomiting & Drowsiness.
- ② Air Hunger "*Kausmall's respiration*"
- ③ Bone decalcification in chronic cases.

★ Treatment:

- ① If mild to moderate acidosis → Treat the cause.
- ② If Severe acidosis → I.V HCO_3^- estimated as
Body weight (Kg) X 0.3X base deficit

B**Metabolic Alkalosis****★ Definition:**

This is a condition where there is An acid deficit or Base excess.

★ Aetiology:

- ① GIT loss of H^+ : Excessive vomiting or suction of gastric secretion
- ② Renal loss of H^+ with Aldosterone or Hypoparathyroidism
- ③ Hypokalaemia: stimulates intracellular H^+ Shift
- ④ Bicarbonate retention:
either a or b
 - a- NaHCO_3 - administration
 - b- Milk Alkali syndrome.
- ⑤ Plasma bicarbonate with severe ECF e.g severe vomiting.

★ Diagnosis:

- ① Cheyne-stokes respiration (slow & deep) with period of apnea
- ② Tetany i.e level of ionized Ca^{2+}
- ③ Hypokalaemia.

★ Treatment:

- ① If mild with (no Hypokalaemia) → I.V saline in fusion (kidney will correct by retaining CL & excreting Na^+ with excess bicarbonate) But if Hypokalaemia → I.V KCL
- ② If Severe (Not responding to the above measures) give
 - a. Ammonium Chloride slowly I.V (140 mEq)
 - b. I.V Hydrogen chlorid through central line given as 0.05→0.15 NH_4 solution
- ③ If Tetany → (10%) Ca. Gluconate I.V slowly.

C Respiratory Acidosis	D Respiratory Alkalosis
Definition: The condition is due to $\uparrow$ Co_2 associated with $\downarrow$ pH	Definition: The condition is due to $\downarrow$ Co_2 below normal level & $\uparrow$ pH
Aetiology: ① Respiratory depression: by $\rightarrow$ - Drug as opiate - CNS Lesion - Cardiac Arrest ② Respiratory muscles disorders: - My asthenia - Flail chest - obesity. ③ Impaired alveolar functions female: $\rightarrow$ - COPD - Pulmonary oedema	Aetiology: ① Hyperventilation: as in - Hysteria - Hyper-pyrexia - Brain stem lesion. - Bacterial sepsis - Ventilators ② P.t undergo neurosurgical procedures may be Hyperventilated $\rightarrow$ cerebral blood flow.
Diagnosis: ① Restless & cyanosed patient. ② Post-operative Hypertension tachy cardia & Hypercapnia. ③ The best for sure diagnosis is serum PH & PCO_2.	Diagnosis ① Tetany in severe Alkalosis ② Respiratory Arrest. N.B: Alkalosis impair cardiac output in cardiac patient ③ The Best for sure diagnosis is serum PH & PCO_2.
Treatment: Improve ventilation + Aiding renal compensation	Treatment: ① If Hysteria $\rightarrow$ Instruct the patient to breathe into a bag. ② Sometimes $\rightarrow$ CO_2 addition to inspired gas mixture but the danger is in mistake of a compensatory metabolic acidosis.

Chapter [4]

Surgical Nutrition

Chapter [4]

Surgical Nutrition

Physiological Considerations

- * Maintaining a healthy nutritional status requires the following daily balanced supplementation.

	Kg	For (70 Kg)Person
• <i>Water</i> (ml)	35	2450
• <i>Carbohydrate</i> (g).	2	140
• <i>Fat</i> (g).	3	210
• <i>Protein</i> (g).	0.7	50
• <i>Nitrogen</i> (g).	0.7	7
• <i>Na⁺</i> (mmol).	1	70
• <i>K⁺</i> (mmol)	1	70

Malnutrition in Surgical patient

* Causes of Malnutrition surgical patient :

[A] Starvation:

- ① Social causes.
- ② Dysphagia.

[B] Hypercatabolism:

- ① Major trauma and burns.
- ② Major surgical operations.
- ③ Severe acute pancreatitis.
- ④ Major sepsis e.g. septicaemia.

* Effects of Malnutrition on the outcome of surgery :

- ① Impairment of wound healing may lead to burst abdomen
- ② Immunosuppression with ↑ susceptibility to infection.
- ③ Delay physical recovery & hospital stay.
- ④ ↓ Tolerance to Radiotherapy and Chemotherapy.

* Diagnosis of Malnutrition :

[A] Anthropometric measures:

- ① Recent nutritional weight loss ? 10%
- ② Body weight is less than 80% (of the ideal for height).
- ③ Mid-arm muscle circumference less than 80% (of value in comparable population) = (muscle mass).
- ④ Triceps skin fold thickness (measured by a caliper) is an indication of fat loss

[b] Laboratory:

- ① Serum albumin $< 35\text{g/L}$ = Server protein loss.
- ② measurement of daily nitrogen output in urine to, then compared with nitrogen intake (grams of nitrogen = grams of protein $\div$ (6,25) provides a rough idea about nitrogen balance.

[C] Immune Function:

- ① Total lymphocytic count $< 1,2 \times 10^9/\text{L}$.
- ② Impaired hypersensitivity reaction.

Nutritional Support

(A) Enteral nutrition

- * Indications : patients in whom oral intake is inadequate, while having a functional accessible G.I.T as (comatosed patients, severe dysphagia, burns or Head & Neck surgery)

* Routes of administration :

① Nasogastric tube.

② Gastrostomy



* Administration Formulae :

(A) Through Gastrostomy → liquid diets, Juice, milk.

(B) Through jejunostomy → isotonic sterile formula at a slow rate, otherwise the Patient develops (colics, distention & diarrhoea),

* Complications:

(A) Mechanical complications:

- ① Pharyngeal or Oesophageal mucosal irritation, ulceration by feeding tube.
- ② Obstruction of the feeding tube.
- ③ Tube displacement

(B) G.I.T Complications: Nausea, Vomiting, Aspiration pneumonia
Distention, colics & diarrhaea.

(C) Metabolic complications: glucose intolerance, electrolyte imbalance & malnutrition.

(B) Parenteral Nutrition*** Indications:**

- ① In malnourished or hypercatabolic patient in whom the intestine fails to absorb nutrients e.g (inflammatory bowel disease)
- ② Preoperative administration to severely depleted patients (for 2 weeks) to
 ↓
 postoperative morbidity and mortality.

*** Rout of administration:**

central venous line through internal jugular vein Fig ①
 or subclavian vein Fig ②

*** Administration Formulae:**

- **Carbohydrates:** 25% glucose.
- **Proten:** L-amino acids (e.g Vamin novoplex)
- **Fat emulsion:** Intralipid 10% and 20% isotonic produced from soya oil (1L 20% intralipid → 2000 Kcal/ day).
- **I.V vitamins:** B₁₂
- **Iron preparation:** I.M. injection.
- **Trace elements:** Phosphate, magnesium, Ca⁺
- **Electrolyte supplementation:** Na⁺, K⁺

N.B: the amount needed daily or weekly vary according to the degree of malnutrition, age acid, base balance.

*** Monitoring of efficiency and complications:**

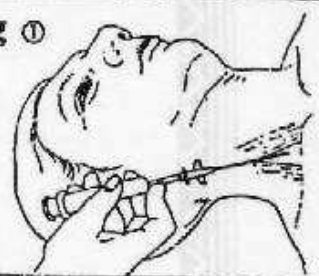
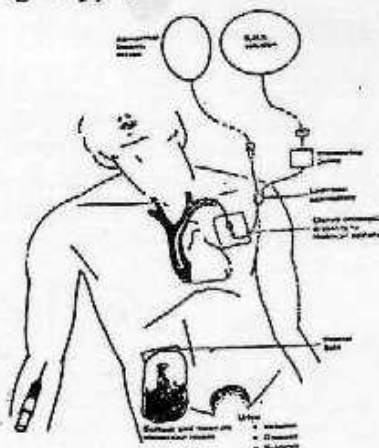
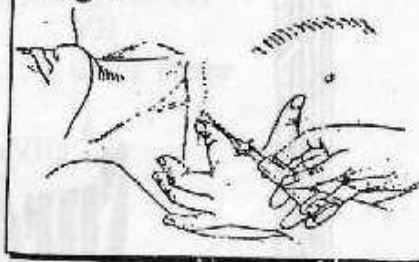
- ① Daily measuring body weight (a weight gain > 300g /day) is due to water retention.
- ② Balance of daily input and output.
- ③ Daily Lab: a. Full blood picture.
 b. Blood Urea, K⁺, Na⁺, CL⁻
 c. Serum albumin, glucose.
 d. Urine for nitrogen.
- ④ Twice weekly Lab: a. liver functions tests
 b. Blood coagulation studies.
 c. Serum trace elements.

*** Complications:****[A] Metabolic complications:**

- ① Over or underfeeding of the patient.
- ② Hyponatraemia, Hypokalaemia, Hyperglycaemia
- ③ Hyperosmolar dehydration.

[B] Catheter complications:

- ① Displacement of the catheter outside the vein.
- ② Puncture of pleura → Pneumothorax.
- ③ Injury to subclavian or carotid arteries + brachial plexus.
- ④ Air embolism if the infusion set accidentally detached from the catheter.
- ⑤ Venous Thrombosis.
- ⑥ Central venous catheter infection → Thrombophlebitis → Septicaemia.

Fig ①**Fig ②**

Chapter [5]

Surgical Haemostasis

Surgical Haemostasis

* Definition :

The mechanism by which the body attempts to stop bleeding after injury or cutting of a blood vessel .

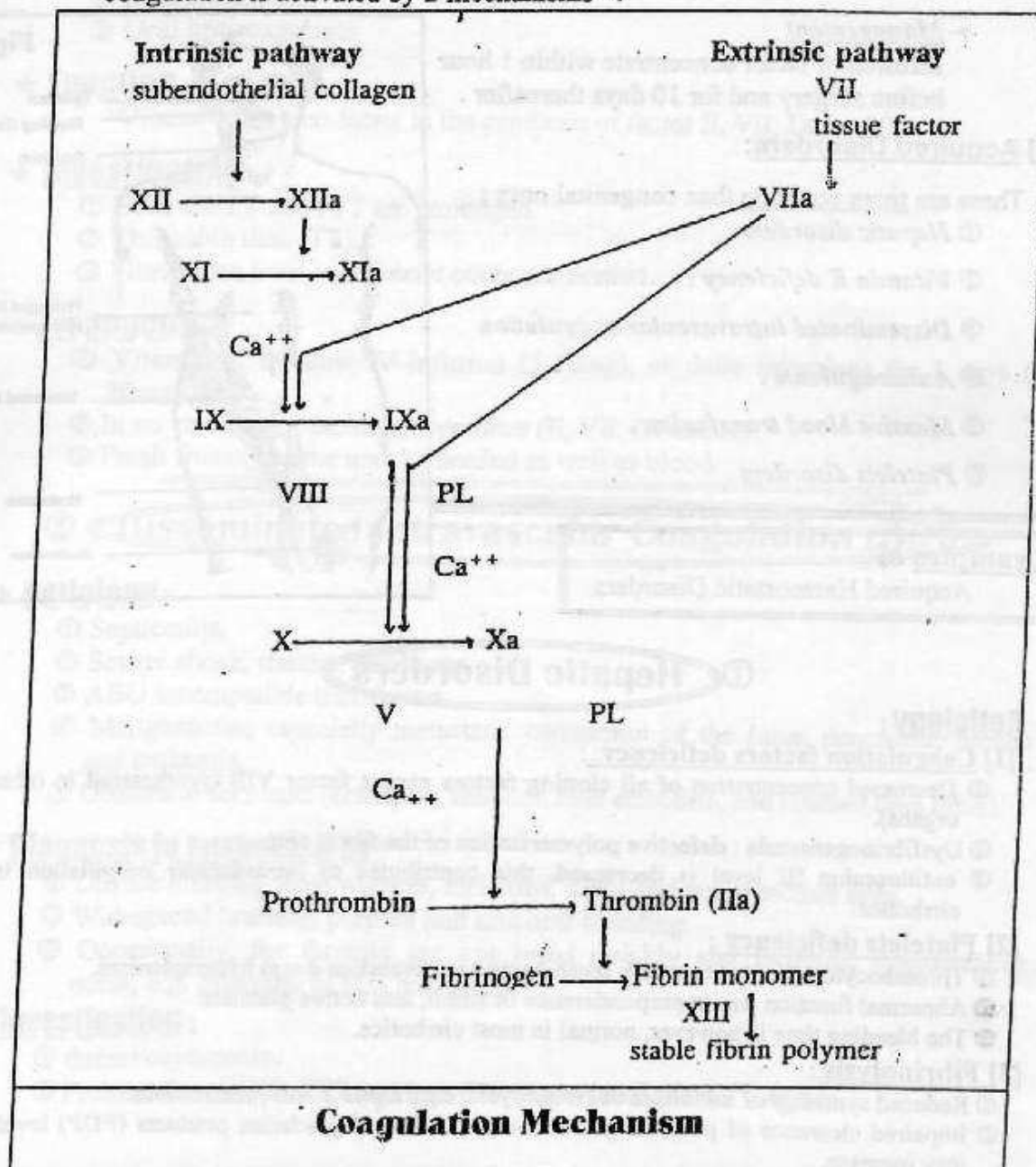
* Physiology :

[A] 1st Haemostasis :

- ① Vasoconstriction of disturbed vessels .
- ② Platelet plug formation .
- ③ Temporarily of bleeding by surrounding tissue tension .

[B] 2nd Haemostasis :

coagulation is activated by 2 mechanisms →



*** Causes of bleeding during or after surgery :**

[A] Inadequate Surgical Haemostasis .

[B] Defects of Haemostasis .

Defects Haemostasis

[A] Congenital Disorders :

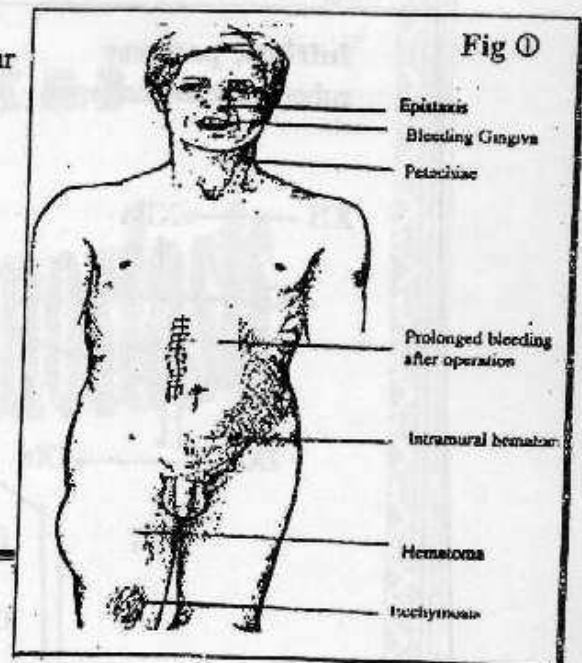
Hemophilia A and B

- These are due to deficiency of factors VIII and IX respectively .
- Hamophilia A is the most common congenital coagulopathy .
- Inheritance (in both) is sex linked (from females to males).
- Management
Infusion of factor concentrate within 1 hour before surgery and for 10 days thereafter .

[B] Acquired Disorders:

These are more common than congenital ones :

- ① Hepatic disorders .
- ② Vitamin K deficiency .
- ③ Disseminated intravascular coagulation
- ④ Anticoagulants .
- ⑤ Massive blood transfusion .
- ⑥ Platelets disorders .



**Examples of
Acquired Haemostatic Disorders**

① Hepatic Disorders

★ Aetiology:

[1] Coagulation factors deficiency :

- ① Decreased concentration of all clotting factors except factor VIII (synthesized in other organs).
- ② Dysfibrinogenaemia : defective polymerization of the fibrin clot.
- ③ antithrombin III level is decreased, this contributes to intravascular coagulation in cirrhotics.

[2] Platelets deficiency :

- ① Thrombocytopenia due to splenic sequestration or destruction due to hypersplenism.
- ② Abnormal function due to preponderance of small, less active platelets.
- ③ The bleeding time is however, normal in most cirrhotics.

[3] Fibrinolysis :

- ① Reduced synthesis of inhibitors of fibrinolysis, e.g., alpha 2 anti-prothrombin.
- ② Impaired clearance of plasminogen activators. Fibrin degradation products (FDP) level may increase.

★ Treatment :

- ① Vitamin K administration.
- ② Fresh frozen plasma (2-3 units) replaces the missing coagulation factors and coagulation and fibrinolysis inhibitors.
- ③ Desmopressin (0.3ug/kg) can raise the levels of factor VIII and Von Willebrand, and shorten the bleeding time before an invasive procedure.
- ④ Tranexamic acid or other fibrinolysis inhibitors may be useful in upper GIT haemorrhage.

② Vitamin K Deficiency**★ Aetiology :**

- ① Inadequate diet (or TPN).
- ② In debilitated patients given prolonged broad spectrum antibiotics (reduce colonic bacteria).
- ③ Cholestatic jaundice.
- ④ Malabsorption.
- ⑤ Oral anticoagulants.

★ Function :

Vitamin K is a co-factor in the synthesis of factor II, VII, IX, and X.

★ Investigation :

- ① Both the PT and PTT are prolonged.
- ② Thrombin time (TT).
- ③ Fibrinogen level and platelet count are normal.

★ Treatment :

- ① Vitamin K by slow IV infusion (5-10mg), or daily injections for 3 days (10-20mg/day).
- ② In an emergency, factor concentrates (II, VII, IX and X).
- ③ Fresh frozen plasma may be needed as well as blood.

③ Disseminated Intravascular Coagulation (DIC)**★ Aetiology :**

- ① Septicemia.
- ② Severe shock, trauma, and burns.
- ③ ABO incompatible transfusion.
- ④ Malignancies, especially metastatic carcinoma of the lung, pancreas, prostate, and leukemia.
- ⑤ Obstetric accidents (eclampsia, amniotic fluid embolism, and retained dead fetus).

★ Diagnosis is suspected by :

- ① Diffuse bleeding from wounds, incisions, drain and venipuncture sites.
- ② Widespread bruising, purpura and mucosal bleeding.
- ③ Occasionally, the thrombi are not lysed quickly and ischemic manifestations occur, e.g. gangrene of skin and digits.

★ Investigation :

- ① thrombocytopenia.
- ② Prolongation of PT, PTT and low fibrinogen level ($N = 2 - 4g/L$).

★ Treatment:

- ① Treatment of the underlying cause to stop the cycles of coagulation/fibrinolysis, e.g. draining an abscess and antibiotics for infection.
- ② Replacement of consumed coagulation factors and platelets with fresh frozen plasma and platelet transfusion.
- ③ Blood transfusion to restore circulating blood volume and oxygen carrying capacity since hypoxia exacerbates DIC.
- ④ Heparin to stop the thrombotic component is not widely advocated.

④ Anti-Coagulants Therapy

Can cause bleeding if the dose is not properly adjusted (look chapter D.V.T.)

⑤ Massive Blood Transfusion

With stored blood (look chapter Blood Transfusion).

⑥ Platelets Disorders**[A] Thrombocytopenia :**

- ☞ Essential thrombocytopenic purpura.
- ☞ Secondary thrombocytopenic purpura may occur secondary to drugs as thiazides, methyl dopa and sulfa drugs, chemotherapy or radiotherapy.

[B] Disorders of platelets functions :

- ① Drugs as aspirin and NSAID inhibit cyclooxygenase and prostaglandin synthesis, thus they interfere with platelet adhesiveness.
- ② Cephalosporins and semisynthetic penicillins coat platelets.
- ③ Dipyridamole (Persantine) reduces platelet adhesiveness.
- ④ Uremia and hypothermia can cause platelet dysfunction.

Pre-operative Evaluation of Haemostasis**[A] History :****① Personal History :**

Age : e.g. childhood (Hereditary disorder).

② Present History :

History of abnormal bleeding from multiple sites (see Fig ①)

▪ Characters of the bleeding :

(a) **Defects of 1st Haemostasis:** The bleeding is superficial
i.e. Skin, Mucous membrane ... etc.

(b) **Defects of 2nd Haemostasis:** the bleeding is deep
i.e. Haemostasis in muscle, Haemarthrosis ... etc.

③ Past History :

History of liver disease, chronic renal failure, massive blood transfusion & drug intake .

④ Family History :

Suggests Haemophilia (A or B)

[B] Examination :

- ① Cutaneous signs of liver disease, e.g. jaundice, and spider naevi.
- ② Skin and mucous membranes are examined for bleeding.
- ③ Musculoskeletal system. Muscle Haematomas & Hemarthrosis.
- ④ Abdomen. Hepatomegaly & Splenomegaly.
- ⑤ Lymph node enlargement may be caused by lymphoma, chronic lymphocytic leukaemia & IMN

[C] Tests of Haemostasis :**▪ Indications:**

- ① Patients with Personal history or Family history of abnormal bleeding.
- ② Patients with diseases or who receive medications that can interfere with haemostasis.

▪ Tests for Primary Haemostasis :

- ① Platelet Count: Normal = 150,000-400,000/ul.
 - Spontaneous bleeding occurs with counts 10,000-20,000/ul.
 - No hemastatic abnormality occurs in counts more than 100,000/ul.
- ② Bone Marrow Aspiration & Biopsy:
 - Megakaryocytes are normal or increased in Thrombocytopenia
- ③ Bleeding Time (BT) is prolonged with platelet and vascular defects.
- ④ Tests of platelet fuction (Adhesion, Release, Aggregation)

▪ Tests of scondary Haemastasis :

- ① The PT (Prothrombin Time) measures the time of clotting though the Extrinsic and common pathways which involve factor VII & Factors X,V,II and fibrinogen respectively
- ② The PTT (Partial Thromboplastin Time) measures the time of clotting through the Intrinsic pathway (factors XII,XI,IX,and VIII) and the common pathway.

④ Other Tests :

- Fibrinogen level is decreased in DIC.
- Fibrin degradation product (FDP) screens for fibrinolysis.
- Individual coagulation factor essays.
- Clot stability test evaluates factor XIII, deficiency of which is not detected by the PT or PT

Chapter [6]

Surgical Infections & Antibiotics

I Surgical Infections

I Acute Non Specific Infections

- * ① Post-operative wound Infection.
- * ② Boil (Furuncle).
- * ③ Carbuncle.
- ④ Cellulitis.
- ⑤ Erysipelas.
- ⑥ Bacteraemia & Septicaemia.

① Post-operative wound Infection

This is a serious problem that may complicate operative wounds,

- Contaminating microbes may be derived from:
 - ① The patient himself (Endogenous).
 - ② The patient's environment (Surgical team, Instruments, Dressing ...etc)

* Predisposing Factors:

[A] General Factors:

- ① Poor general condition.
- ② Systemic diseases that impair host defense as Diabetes or Uraemia.
- ③ Drugs that cause immunosuppression as corticosteroids.

[B] Local Factors:

- ① Poor blood supply
- ② Poor surgical Techniques e.g Rough handling of tissues, or improper haemostasis leading to haematoma formation
- ③ Presence of foreign bodies as prosthetic implants.
- ④ Nature of the operation e.g Operations for peritonitis, colonic resection especially for unprepared colon.
- ⑤ Defect in the sterilization technique in the operating theatre.

* Types of surgical wounds:

- (A) Clean: There is no gross contamination from endogenous or exogenous sources such as Herniorrhaphy and Thyroidectomy wounds.
The Risk of infection is 1-2%
- (B) Clean contaminated: Wounds involve regions of the body that may contain low numbers of resident organisms e.g urological procedures, or surgery on prepared colon.
The Risk of infection is 2-5 %.
- (C) Contaminated: an unprepared region of the body with numbers of endogenous organism is entered e.g surgery on unprepared colon.
The Risk of infection is 5-30%.

* Pathology :

The process of wound infection passes into this stages:

- ① Original contamination
- ② Acute inflammatory stage with local vasodilatation and infiltration by polymorphonuclear leucocytes.
- ③ Suppuration with purulent discharge.
- ④ Once the pus is properly drained and infection controlled the stage of healing starts

* Clinical Picture :

Usually appears between the fifth and tenth days post operatively:

- Postoperative fever.
- Pain in the wound
- The wound is swollen tender and red.
- Fluctuant areas or crepitus can occasionally be felt.

* Differential diagnosis :

[A] Other causes of postoperative fever,

e.g Chest infections, DVT ...etc.

[B] Other causes of wounds swelling

e.g Haematoma, and Incisional hernia...etc.

* Prophylaxis :

- ① The patient's defence mechanisms should be improved and any predisposing factor should be controlled e.g diabetes, malnutrition, and anaemia

- ② Prophylactic antibiotics are indicated in ↗

[A] Clean contaminated or contaminated surgery.

[B] In wounds where foreign material is implanted

▪ Prophylactic antibiotics:

should be given pre-operatively, during the operation and in the early post-operative period.

- ③ Before any elective colorectal surgery,

Mechanical and Chemical preparation of the bowel are recommended

- ④ Proper surgical Technique:

e.g gentle handling of tissues, adequate haemostasis.

- ⑤ Heavily contaminated wounds,

e.g operations in septic, should be left open (skin and subcutaneous tissue) for delayed primary closure.

* Treatment :

- The wound should be opened and stitches removed to allow pus drainage.
- Antibiotics guided by culture and sensitivity tests.
- Possible sources of hospital should be traced and corrected.

II

Boil [Furuncle]

- This is a staphylococcal infection of a hair follicle or a sebaceous gland
- More common in diabetics and whenever there is lack of personal hygiene.
- Necrosis of the central part occurs and is discharged together with pus

*** Treatment :**

- 1- Antibiotics effective against staph. organisms. (Incision may be needed).
- 2- Icthiol ointment.
- 3- Painting the surrounding skin with an antiseptic to prevent infection of the neighbouring glands or hair follicles.

N.B. : Always suspect diabetes melitus in patients who develop recurrent boils.



III

CARBUNCLE*** Definition :**

Carbuncle is Acute non specific infection of skin & S.C tissues ending by infective gangrene.

*** Aetiology :**

- Organism : Staphylococcus Aureus.
- Predisposing Factors : Patient > 40 years with DM or Immuno-suppressive.
- Mode of Infection : Lack of cleanliness at Hairy areas of Face, Nape of neck, Back & Dorsum of hand.

*** Pathogenesis :**

Infection start in Hair Follicle then extends to S.C. tissues. Staph. Aureus is potent necrotoxin → Necrosis & Sloughing of Overlying Skin → gangrene.

*** Clinical Picture :****(A) General Examination**

Severe Toxaemia

(B) Local Examination

- Painful indurated skin & S.C Tissues.
- Localized Red area with central softening but No fluctuation.
- Multiple pustules →

Appears on the surface, which bursting leaving a cribriform appearance. Some of them coalesces forming ulcer which allow separation of the slough, i.e. Infective gangrene.



Carbuncle

* Complications :

- Spread of infection → Cellulitis, Lymphangitis & Lymphadenitis.
- Septicaemia & Pyaemia.
- Cavernous Sinus Thrombosis if the carbuncle in the face.
or Meningitis & Epidural abscess, if the Carbuncle in the Back.

* Investigation :

Culture & sensitivity test for the discharge.

* Treatment :

(A) General ttt

- ① Improve General Health (Diet, Vitamines etc.).
- ② Control of D.M if present.
- ③ Systemic A.B. According to Culture & Sensitivity test.

(B) Local ttt

- ① Strong local A.B.
- ② Glycerine Magnesia local foment to help separation of sloughs.
- ③ Excision of Sloughs.



Cellulitis

* Definition:

This is an invasive non suppurative infection of the loose connective tissue

* Aetiology:

- Organism:
Gram +ve bact. mostly streptococci or occasionally staphylococci into the superficial skin structure.
- Mode of infection:
Through Cratch or Prick

* Clinical Picture

- General
Toxaemia (Fever, Headach, Malaise & Anorexia)
- Local:
 - ① The affected area is red, indurated, hot & painful
 - ② It spread rapidly & the Advancing edge is ill defined.
 - ③ No suppuration except at portal of entry.

* Treatment

- ① Rest & elevation.
- ② Local heat.
- ③ Antibiotics (pencillin group)
N.B: Garful follow up is needed in order not to miss a hidden abscess.

V**Erysipias***** Definition:**

This is a rapidly spreading non-suppurative infection of the lymphatics of the skin.

*** Aetiology:**▪ **Organism:**

Specific strains of Haemolytic streptococci

▪ **Mode of infection:**

Through minute scratch or abrasion.

*** Clinical Picture:**▪ **General:**

Toxaemia (Fever, Headach, Malaise & Anorexia)

▪ **Local**

Similar to cellulitis but

- ① The colour of the skin is rose-ink.
- ② The edge is well defined, slightly raised & often shows minute vesicles just behind the spreading margin.
- ③ There may be islets of inflammation beyond the spreading margin separated from the main area by apparently normal skin.

*** Treatment:**

Similar to cellulitis but the patient must be isolated because the disease is very contagious

VI**Bacteraemia & Septicaemia***** Bacteraemia:**

- Presence of bacteraemia which are not multiplying, in the blood.
- It usually follows dental work and instrumentation of the urinary tract.
- Hazardous in patients with damaged heart valves or with prosthetic valves. Antibiotic prophylaxis is essential in such cases.

*** Septicaemia:**

- Presence of multiplying organisms in the blood stream plus leucocytosis
- It usually denotes significant infection in which bacteria, bacterial toxins or inflammatory mediators escape the control of the immune system, enter the blood stream and produce a systemic response including chills, Fever and sometimes pulmonary failure or shock.

N.B**Toxaemia :**

Presence of toxins in the circulation

Pyæmia:

Presence of septic emboli in the circulation.

N.B.

I- Chronic specific Infections:

- (1) Tuberculosis (T.B).
- (2) Syphilis.
- (3) Actinomycosis.
- (4) Nocardiosis

See Int. Medicine

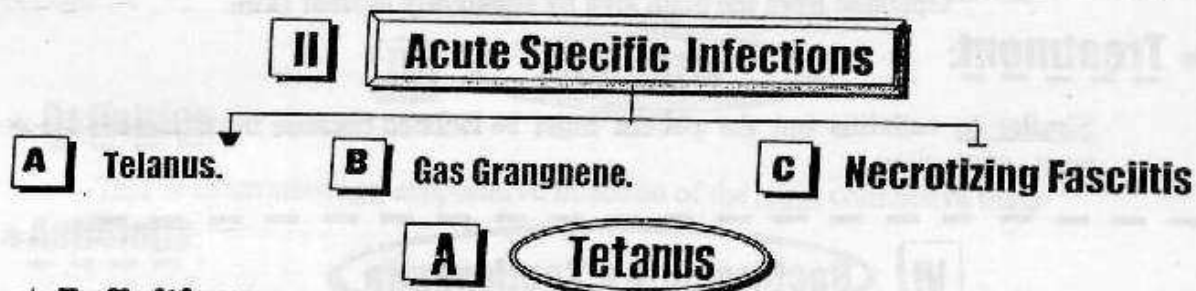
II- Parasitic Infections:

- (1) Schistosomiasis (Bilharziasis)
- (2) Filariasis.
- (3) Amoebiasis.
- (4) Echinococcosis (Hydatid disease)

See later

III- Fungal Infections:

e.g. Candidiasis.



*** Definition :**

Tetanus is Acute specific anaerobic infection caused by Neurotoxin of Clostridium Tetani which leads to nervous irritability & muscular contraction

*** Aetiology :**

• Organism : Clostridium Tetani.

- Which is
- Gram +ve anaerobic bacilli, Spore forming with Drum stick shape
 - Naturally the organism living in small intestine of Horses.
 - The spores present in Street dirt & Manured soil. This spores resist to Antiseptics, Heat or Boiling for 5 min.

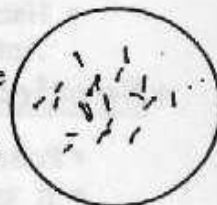
• Predisposing Factors :

The Anaerobic organisms flourish more in wounds with low oxygen tension as

- ① Deep Wounds especially if Contused.
- ② Tissue Anoxia from Hge & Shock.
- ③ Associated Pyogenic Infections (Which Consumes Local Oxygen).

• Mode of Infection :

- ① Wounds : Hypoxic wounds contaminated with soil.
- ② Tetanus Neonatorum : From infected umbilical stump.
- ③ Surgical Tetanus : Improper Sterilization on the Cat-gut Sutures.



* Pathogenesis :

The organism produce powerful Neurotoxins → Blood → B.B.B → CNS → Motor end plate & Motor cells → Hyper-excitability of Motor cells. So Any Minor Stimuli → **Violent Generalized Spasm**.

* Clinical Picture :

The Incubation Period in Non immunized patient = 24 h – 14 days but in immunized patient = 11 days → several weeks

[A] Stage of Toxaemia

- ① ↑ Temperature i.e Rigors.
- ② Irritability & Headache.
- ③ GIT Disturbance.

[B] Stage of Tonic Rigidity

- ① Pain & Tingling of area affected.
- ② Spasm of facial muscles "**Risus Sardoniacus**" = Bitter Smile & limitation of jaw movement "**Trismus**" = Lock Jaw. → 
- ③ Neck Stiffness difficulty in swallowing due to affection of muscles of deglutition.

[C] Stage of Colonic Spasm "Convulsion"

- ① Severe muscle contraction with incomplete muscle relaxation due to minor stimuli as bright light, Noiseetc
- ② Back is arched backwards i.e. **opisthotonos** → 
- ③ Spasm of diaphragm & Intercostal muscles → Respiratory insufficiency
- ④ Marked Tachycardia is a grave sign.
- ⑤ Elevated Temp. with Profuse Sweating.
- ⑥ The violent convulsions may leads to rupture of muscles e.g. "Rectus abdominis" or Fracture Bone.

* Special Types of Tetanus :

- Acute Tetanus : Affect the Unimmunized, Short I.P. & Death in few days.
- Chronic Tetanus : Affect the Immunized, long I.P. & Mild symptoms.
- Local Tetanus : Occur in immunized patient where general Toxaemia is absent & Localized muscular affection only.
- Splanchnic Tetanus : Only affect muscles of Deglutition → Dysphagia or Only affect muscles of Respiration → Dyspnea.
- Cephalic Tetanus : Due to wound of face or scalp.
- Cryptogenic Tetanus : Mild & without an overt wound.

* Causes of Death :

- Toxaemia or Hyperpyrexia.
- Exhaustion from Severe Convulsions.
- Heart failure, Respiratory failure & Asphyxia from laryngeal spasm.

* D.D :

- Trismus : From Arthritis of Temporo-mandibular joint.
- Meningitis : Turbid CSF containing organisms & Leucocytosis.
- Others as ∞ :
 - ① Strychnine poisoning: complete relaxation between attacks.
 - ② Tetany: Carpo-pedal spasm + ↓ Serum Ca.
 - ③ Rabies: History of Dog bite + Spasm occurs mainly on seeing or drinking water.

* Management :

I) Prevention

Every Child Should be Immunized by a Routine (D.P.T) vaccines at 2,4,6, Months then a booster dose of Tetanus Toxoid is taken every 7-10 years.



According to this facts, there are 3 possibilities for prevention :

- (A) IF Patient previously received 3 or more doses of Toxoid & The last one within 10 years:
A booster dose of Tetanus Toxoid is needed on exposure to Tetanus prone wounds (0.5 ml I.M.).
- (B) IF patient previously received less than 3 doses:
 - With Clean minor wounds → Only Tetanus Toxoid is needed on exposure to Tetanus prone wounds.
 - With wounds having High risk of Tetanus → Both Tetanus Toxoid & Tetanus Immunoglobulin (TIG) is given.
- (C) IF Patient (Not) previously Immunized:
 - With Clean minor wounds → Only Tetanus Toxoid is needed but 3 doses with 4-6 weeks interval.
 - With wounds having High risk of Tetanus → Both Tetanus Toxoid (3 doses) & Tetanus Immunoglobulin (T.I.G.) is given (250 U I.M.) + **Strong A.B.**

III) Treatment

- ① Neutralize Toxins with (TIG) : 3000-6000 unites I.M.
Repeated doses may be needed, since the half life of Antibodies 3 weeks & the Established tetanus often lasts longer.
- ② Excise & Debride the wound :
The wound must be left open & Washed by "Hydrogen Peroxide"
- ③ Penicillin-G :
10-40 million Unit/ day I.V.

- ④ The patient should be protected from Sudden minor stimuli, So he is isolated in a dark quiet room.
- ⑤ Proper Sedation is used: As Barbiturates but cautiously as they often cause Cardio-respiratory failure.
- ⑥ Tracheostomy: If Respiratory problems is Associated.

* Prognosis :

The Mortality Rate = 30-60%.

B

Gas Gangrene

(Clostridial Myositis)

* Definition :

Gas gangrene is Acute specific anaerobic infection caused by Gas forming Clostridium group leads to gas formation & End by infective gangrene.

* Aetiology :

• Organism : Clostridium Group :

- Which is • Gram +ve anaerobic bacilli, All of them are Motile & Non capsulated except CL. Welchii.
- Some of Clostridia Naturally living in intestine of Animal & Man
- They are 2 groups : Saccharolytic or Proteolytic group.

• Predisposing Factor :

- The Anaerobic organisms flourish more in wounds with low oxygen tension e.g. ① Lacerated wounds involving bulky muscles.
 ② Ischaemia of muscles or devitalized Tissues.
 ③ Contaminated above knee stump by stool if patient suffer from faecal incontinence.

• Mode of Infection :

The organism exist normally in bowels of Man & Animal. So Thigh & Buttocks particularly affected being near to faecal contamination.

* Pathogenesis

- ① General Blood Haemolysis → Ting of Jaundice. ALSO Degenerative changes of liver & Kidney may occur.

- ② Local : According to Type of organism:

[I] Saccharolytic Organisms: [CL. Welchii-CL. Spticum-CL. Oedematiens]

They ferment Glycogen of Devitalized or (ischaemic) muscles → Liberation of ($\text{CO}_2 + \text{H}_2$) → Haemolysis of Blood → Liberation of blood pigments which stain the dead muscles by Brick red colour.

[II] Proteolytic Organisms : [CL. Histolyticum-CL Sporogens-CL. Tertium]

They ferment Proteins of Devitalized or (ischaemic) muscles → liberation of [Ammonia & Hydrogen sulphide] → Haemolysis of blood
 ↑ Iron from hemoglobin which combines with the Hydrogen sulphide
 → Iron sulphide which stain the dead muscles by Greenish black colour.

* Clinical picture :

The incubation period varies from few hours to few days

(A) General Examination

- ① The patient shows Pallor, Fever & Marked Tachycardia.
- ② Icteric Jaundice & Oliguria.
- ③ In severe cases patient is shocked

(B) Local Examination

- ① Tense & Swollen limb.
- ② Wound Stitches are seen under tension with crepitus sensation.
- ③ A Sanguinous discharge with Characteristic Foul odour exudate from wound.
- ④ Skin over shows greenish to black Coloration.
- ⑤ The affected muscles don't contract or bleed if cut.
- ⑥ The affected muscles show greenish black or brick red coloration

* Special Types of Gas Gangrene :

(A) Massive Type : (The usual) If affect several muscles.

(B) Local Type : (Less common) If affect a muscle or a group of muscles.

* Causes of Death :

- Severe Toxemia.
- Haemolysis & Jaundice.
- Damage of Kidney & liver.

* D.D :

From Other Clostridial Infections

- Simple Contamination : Localized to site of infection & Non Invasive.
- Gas Abscess : As simple contamination but no muscle affection.
- Others: As $\Rightarrow$
 - ① Clostridial Cellulitis: Superficial & Localized to S.C Tissue.
 - ② Myositis : Localized to one group of muscles.
 - ③ Oedematous gangrene: Caused by CL. Oedematiens & Characterized by No gas production

* Management :

[1] Prevention

- ① Adequate debridment of wound with Excision of dead muscles.
- ② Strong Antibiotics especially Pencillin.
- ③ Adequate Circulatory support in severe injuries :
Is required to avoid tissue hypoxia.

N.B. Polyvalent Anti-gas gangrene serum
Not used in Modern surgery

III Treatment

(A) General ttt

- Fresh Blood Transfusion.
- Strong A.B.: Penicillin 10-40 million Unit/ day I.V.
- IF Available "Hyper-barric Oxygenation"
 - *It is oxygen* drenching in a pressure chambre.
 - *It is given* At 3 Atm for 1-2 hours and is repeated every 6-12 hours. [3 - 5 exposures are usually necessary].
 - *It inhibits* bacterial invasion & production of Toxins.

(B) Local ttt

- The wound is opened & All dead tissues are excised.
- Tight fascial Compartment are decompressed.
- The Deep fascia is left open.

N.B : ① Daily debridement is necessary under anaesthesia .
 ② Amputation with Massive type.
 ③ Diverting Colostomy: In Extensive perineal infection

* Prognosis :

The Mortality Rate = 20%

C

Necrotizing Fasciitis

* Aetiology :

- * Organism: Mixed microbial Flora
- * Predisposing Factors:
Immunocompromised patients e.g. diabetic patients.
- * Mode of infection:
Through a puncture wound, leg ulcer or a surgical wound .

* Pathology:

- The infectious process spreads along the Fascial planes which leading to thrombosis of the vessels passing between the skin and deep circulation.
- There is ischaemic changes lead to superficial skin nerosis

* Clinical picture :

[A] General:

- The patient is alert .
- Toxaemion (Fever, Headach, Malaise & Anorexia)
- Tachycardia.

[B] Local:

- The skin shows haemorrhagic bullae & necrosis.
- The skin surrounded by odema & inflammation.
- The skin may be anaesthetic.

*** Investigations:**

- Gram stained smears & cultures show the mixed nature of infection.

*** Prevention:**

Adequate debridement of wounds & Antibiotics for contaminated wounds .

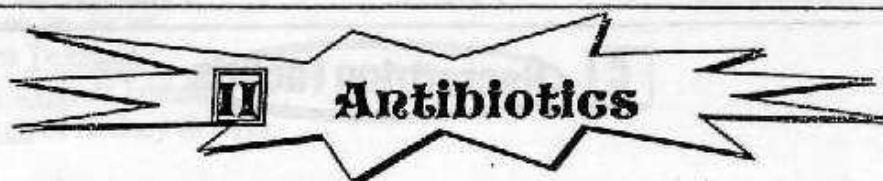
*** Treatment :**

[1] Surgical : Debridement (under anaesthesia) .

[2] Medical : Penicillin (20-40 million units/day / I.V) together with
Gentamycin (5mg/kg/day) or Amikacin (15mg/kg/day)

*** Prognosis :**

In many cases the diagnosis is missed so the disease has a fatal outcome.



*** Guide lines for Antibiotics prescription :**

[A] The patient:

- ① Age, sex, pregnancy & lactation.
- ② The condition of Renal & Hepatic function
i.e (sites of Antibiotics metabolism)
- ③ Known history of allergy to Antibiotics.
- ④ The uses of other drugs which enhance or ↑ side effects of Antibiotics
e.g contraceptive.
- ⑤ The most suitable route of administration (Oral, IM, IV)

[B] The pathology & causative orgnism:

- ① Establised diagnosis before starting antibiotics.
- ② Wide spectrum & less expensive antibiotics are more preferred the pathology & clinical assessment.

*** Antibiotics In common use :**

[1] For [staph = Gram + ve cocc]

- ① Penicillanase resistant penicilline
e.g Flucloxacillin or Cephalosporins
- ② Clindamycin (Dalacin C)

[2] For [Strept = Gram + ve cocci]

e.g Penicilline or Erythromycin

[3] For (Gram-ve bacilli) Except (E-coli, klebsella & Proteus)

e.g Gentamycine

[4] For (Gram-ve anaerobe) i.e Bacteroids.

e.g Metronidazole (Flagyl) or Clindamycine

[5] For Pseudomonas:

e.g Carbenicilline or Amicaine.

[6] For Entero-cocci: e.g Strept. Fecalis.

e.g Ampicilline

* Action of Antibiotics:

Depends mainly on lysis of cell membrane.

* Complications of Antibiotics:

① Hypersensitivity reaction commonly with penicillin including urticaria, fever & a sthma.

② Vit B deficiency

due to alternation of bowel flora especially with prolonged used

③ Specific Toxicities:

e.g Nephrotoxicity, Ototoxicity & GIT irritation.



Final Written Exams



(1985) • Discuss the treatment of Tetanus

(10 Marks)

(1986) • Complication & ttt of Carbuncle of upper lip.

(10 Marks) دور ثانی

• Measures to prevent Gas gangrene in a lacerated wound of thigh.

(10 Marks) دور ثانی

(1988) • Tetanus : Aetiology, Diagnosis & ttt

(25 Marks)

(1992) • Discuss Aetiology, C/P & ttt of Gas Gangrene

(25 Marks) دور ثانی

(1993) • Discuss treatment of Tetanus

(15 Marks)

• Discuss treatment of Gas Gangrene

(25 Marks)

(1995) • Discuss Aetiology, C/P, Prophylaxis & ttt of Tetanus

(20 Marks) دور ثانی

(1996) • Discuss prevention of Tetanus & Gas Gangrene

(10 Marks)

• Discuss path., C/P & ttt of Carbuncle

(15 Marks) دور ثانی

(2003) • Give a short account on carbuncle

(12 Mark) دور ثانی

(2004) • Discuss post-operative wound infections

(20 Marks) دور ثانی



Chapter [7]

HAND INFECTIONS

Chapter [7]

Hand Infections

* Due to the use of the hand & it's exposure to contamination, the frequency of hand infection is high

So

proper treatment & early interference is needed to preserve the function of hand.

* Classifications :

[A] Cutaneous & S.C Infections:

- ① Paronychia (Acute & chronic)
- ② Pulp space Infection
- ③ Web space Infection

[B] Fascial spaces Infections:

- ① Mid palmar space infection.
- ② Hypothenar space infection.
- ③ Theanar space infection

[C] Synovial sheath Infections:

- ① Acute digital Tenosynovitis
- ② Ulnar bursitis.
- ③ Redial bursitis.

[D] Bone & Joints Infections:

* General principles :

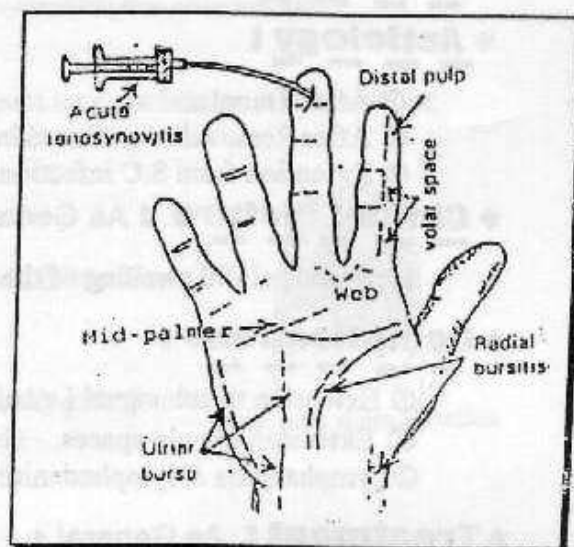
[A] History: usually manual warkers with history of prick or usually house wives.

[B] C/P:

- General examination: Fever, Headch, Malaise & Anorexia or (Hectic fever & throbbing pain) if Abscess.
- Local examination
 - ① Redness, Tenderness, Hotness & Dorsal oedema overlying skin
 - ② Firm Tender L.Ns.
 - ③ The fingers can't be approximated because adduction → ↑ pain

[C] Treatment :

- ① General & Local rest in elevated position.
- ② Early adminstration of strong A.B.
- ③ [Don't wait for fluctuation]
- ④ Incision (nerve crosses hand crease) & under general anasthesia.
- ⑤ Incision is done under tourniquet to have bloodless field
- ⑥ Early restoration of function by movement to avoid stiffness of joints.



A

Cutaneous & S-C Infections

1

Paronychia

1- Acute Paronychia

* **Definition :** It is an acute Inflammation of the hidden Part of the nail, affecting the nail fold

* **Incidence :** The commonest type of hand infections.

* **Aetiology :**

- ① After Trauma.
- ② After Removal of excess skin.
- ③ Extension from S.C infection.

* **Clinical Picture :** As General +

localized painful swelling of the nail fold

* **Complications :**

- ① Extension to subungual i.e below the nail.
- ② Extension to pulp spaces.
- ③ Lymphangitis & lymphadenitis.

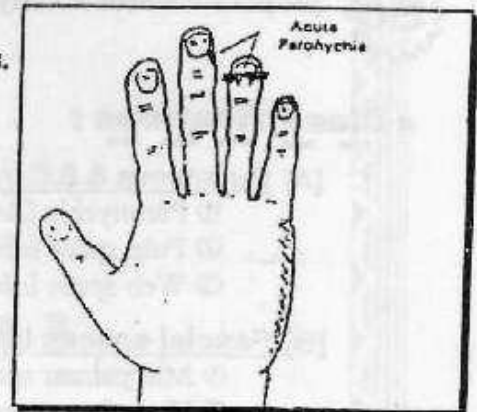
* **Treatment :** As General +

■ **Unilateral:** Triangular flap

(Triangular incision in the skin fold to raise nail fold).

■ **Bilateral:** Quadrangular flap

(Incision of the skin at the both angles of nail fold, raising the nail fold).

2- Chronic Paronychia

* **Definition :** It is a Chronic inflammation.

* **Incidence :** Common with washer women.

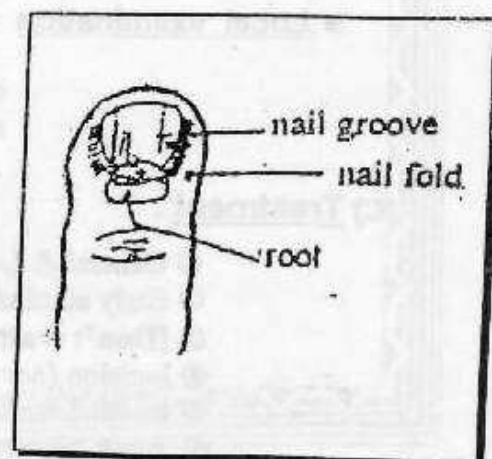
* **Aetiology :** It is a Fungal Infection.

* **Clinical picture :** As General +

Localized painless swelling in the nail fold with trophic changes.

* **Treatment:** As General +

- ① Anti-Fungal treatment
- ② Avoid water.
- ③ Nail extraction.



2

Pulp Space Infections [FELON]**SURGICAL ANATOMY**

- Pulp space is closed compact space Between skin & periosteum.
- It is shut from the middle pulp by a Transverse septum attached to bone.
- It is filled with fat & partitioned by incomplete fibrous septa

*** Aetiology :**

Infection mainly be Staph. organism through direct inoculation by a pin prick or extension from Paronychia.

*** Clinical Picture : As General +**

Localized painful swelling over the distal pulp with induration

*** Complications :**

- ① Tenosynovitis (Tenderness over proximal fingers & palm)
- ② Arthritis (limited movement of All Joint of hand)
- ③ Lymphangitis.
- ④ Lymphadenitis.
- ⑤ Extension to mid or proximal pulp spaces



distal pulp space infection

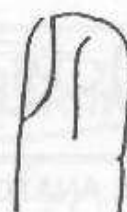
*** Treatment : As General +**

Drained either by ➤

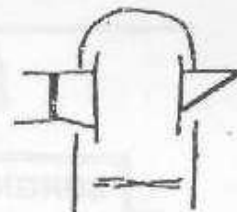
- ① Direct incision over the inflamed point .
- ② Hockey-stick incision if One side of pulp is inflamed
- ③ Trans- fixation incision passing in front of the phalynx with division of all septa if the whole pulp is full of pus .



①



②



③

3

WEB space Infection**SURGICAL ANATOMY**

- Web space is S.C. spaces between the 4 digital slips of palmar Aponeurosis.
- It is bounded by
 - Proximal phalanges on each side
 - Palmar skin in front
 - Dorsal skin behind



IIII Fibroadenoma



Fibroadenoma

* **Incidence** : Commonest breast mass of young female.

* **Aetiology** :

[Benign Tumor of Epithelial cells + Fibrous tissue] It may be

• From the start i.e. De Novo.

Or • On top of Excessive localisation of **Adenosis & Fibrosis** of Fibroadenosis.

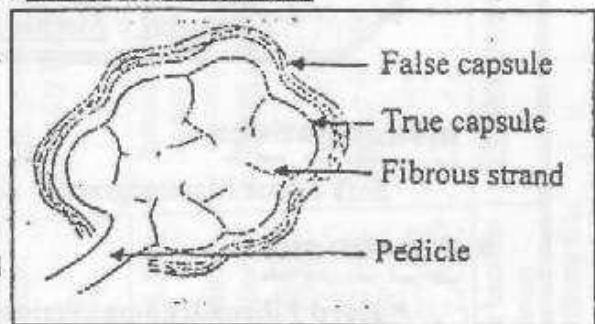
* **Pathology** :

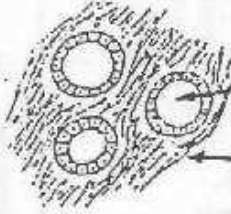
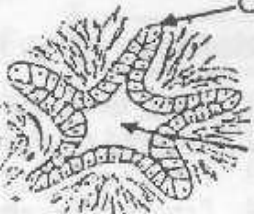
▪ The Tumor is (Well Capsulated) →

• True capsule: Showing fibrous band dividing it into lobules

• False capsule: Formed of compressed breast tissues.

▪ There are 2 Types →



	Hard Fibroadenoma (Peri-canallicular)	Soft Fibroadenoma (Intra-canallicular)
▪ <u>N/E Picture</u>	• Attached to it's capsule by <u>one</u> pedicle. 	• Attached to it's capsule by <u>multiple</u> pedicles. 
▪ <u>Microscopic Picture</u>	Ducts surrounded by <u>Dense F.T.</u> 	Ducts are compressed by <u>F.T.</u> 

* **Clinical Picture** :

▪ <u>Age</u>	20 - 30 years	30 - 40 years
▪ <u>C/O</u>	• <u>Hard</u> & Painless mass. • <u>Slow Rate</u> of growth i.e. malignancy is <u>Rare</u> .	• <u>Soft</u> and Painless mass. • <u>Rapid Rate</u> of growth i.e. malignancy is <u>Common</u>
▪ <u>Exam.</u>	• <u>Hard</u> & not tender. • Well defined edge. • Mobile (Breast Mouse) • No L.Ns Enlargement	• <u>Soft</u> & not tender.

* **Complications** :

▪ <u>Malignancy</u>	• Never	• Commonly → Sarcoma
---------------------	---------	----------------------

*** Aetiology :**

Infection mainly by staph. organism through direct inoculation by a pin prick or extension from mid or proximal spaces infection.

*** Clinical Picture : As General +**

Localized painful swelling over the web space with induration.

*** Complications :**

- ① Tenosynovitis (Tenderness over proximal fingers & palm)
- ② Arthritis (limited movement of All joints of hand)
- ③ Lymphangitis.
- ④ Lymphadenitis
- ⑤ Extension to mid palmar spaces, Hypothenar or thenar spaces i.e Fascial spaces.

*** Treatment : As General +**

Drained by ∞

Transverse incision on palmar surface of web, near its free border . Counter incision may be done posteriorly if the abscess communicates with a dorsal pocket .



B Fascial spaces Infections

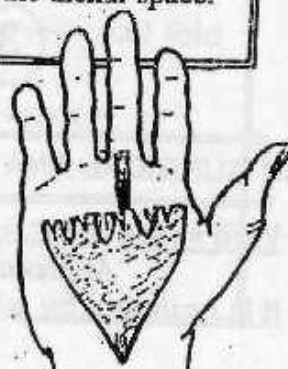
1 Mid palmar space Infection

SURGICAL ANATOMY

- The space is bounded Anteriorly by palmar aponeurosis, Medially by medial septum separating it from the hypothenar space & Laterally by the lateral septum separating it from the thenar space.

*** Aetiology :**

Infection mainly by staph. organism through direct inoculation by a pin prick or extension from web space infection



*** Clinical Picture : As General +**

Localized painful swelling over the mid palmar cavity i.e. [Frog's Hand] with induration.

*** Treatment : As General +**

A Transverse incision is done like that of a web space in distal palmar crease (Hiltons Method) is done using forceps is introduced into the retrotendinous space to drain pus.

2 Hypothenar space Infection*** Aetiology :**

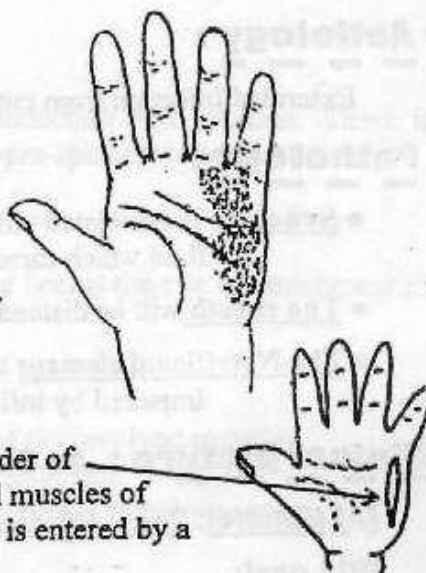
Infection mainly by staph. organism through direct inoculation by a pin Prick or extension from web space Infection between Little & Ring fingers.

*** Clinical picture : As General +**

Localized painful swelling at Hypothenar space with induration

*** Treatment : As General +**

A vertical incision along the medial border of The 5th metacarpal bone is done. The small muscles of The little finger are reflected and the space is entered by a Sinus forceps i.e. (Hilton's Method)

**3 Thenar space Infection***** Aetiology :**

Infection mainly by staph. Organism though direct inoculation by a pin prick or extension from web space infection between Index & Middle fingers.

*** Clinical picture : As General +**

Localized painful swelling at Thenar space

*** Treatment :**

- 1- Transverse incision at the distal end of the thenar eminence at the web then the space is open by a sinus forceps (Hilton's Method).
- 2- Vertical incision on the lateral aspect of the back of the 2nd metacarpal bone, this is the incision commonly used



C

Synovial sheath Infections

Teno-synovitis

SURGICAL ANATOMY

- The middle 3 fingers are surrounded by three Tendon sheath which extend from the distal phalanx to the head of the corresponding metacarpal bones

* Aetiology :

Extended Infection from cutaneous & S.C Tissue

* Pathology :

- Synovitis is associated with excessive clear synovial fluid which turned to be turbid by pus.
- The sheath will be distended.
- The Nutritional element to tendons will be Impaired by inflammatory thrombosis of vessels.

* Clinical picture : As General +

[A] General: Fever, Headach, Malaise & Anorexia

[B] Local:

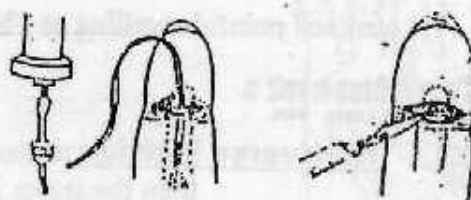
- ① Symmetrical swellings of fingers.
- ② Semiflexion of all joints (Hook sign)
- ③ Extension of inter-phalangeal joints is very painful, while metacorpo-phalangeal joints is slightly painful contrast to mid palmor space infection

* Complications :

- ① Stiffnes Fingers.
- ② Septic Arthritis.
- ③ Spreading Infections.

* Treatment : As General +

- ① Transverse incision over distal crease.
- ② Aspirate pus by a catheter
- ③ Inject Antibiotic



Diseases of Tendons & Fascia

Chronic Tendonitis

1 **Tennis Elbow**

- The patient complains of pain in the elbow at rest and in particular when he uses the hand (extensors). Pain develops at the site of attachment of the extensor muscles of forearm to the lateral epicondyle.

2 **Golfer's Elbow**

- Similar to Tennis Elbow, but it affects the attachment of flexor muscles of the forearm to the medial epicondyle.

3 **Supra-spinatus Tendinitis**

- Pain is felt in the shoulder especially on abduction and rotation. There is localized tenderness over the insertion of the supra-spinatus tendon.

4 **Plantar fasciitis**

- Pain and localized tenderness occur under the heel at the site of attachment of planter fascia to the calcis.

* **Treatment: (1,2,3,4)**

- a- Ask the patient to avoid powerful contraction of the involved muscles.
- b- Local injection of Hydrocortisone and local anesthetics.
- c- When sura-spinatus tendon is calcified surgical release may be needed

5 **Stenosing Teno-Vaginitis**

Spontaneous thickening of tendon sheath which gradually entrap the tendon.

I- Dequervain's disease:

- The common sheath of abductor pollicis longus and extensor pollicis brevis tendon at the wrist is affected by stenosing thickening. Patient develops pain with movements of the thumb.

II- Trigger finger:

- Stenosing thickening affects the retinacula of the flexor tendons in the palm. The affected finger can be flexed. But on extension the patient feels difficulty at a certain angle after which the finger snaps extended like a trigger.

* **Treatment : (5)**

- a. Local injection of Hydrocortisone.
- b. Stenosing Retinaculum can be divided surgically.

Chapter [8]

Tumors & Transplantation

Chapter [8]

I

Tumors

* Definition :

An autonomous, excessive, purposeless and pathological proliferation of cells. This growth continues indefinitely in the absence of physiological stimuli and without regard to its effects on the surrounding tissues.

* Histogenetic Classification Of Tumors :

	BENIGN	MALIGNANT
* <u>Epithelial Tumors</u> <i>Surface</i> <i>Glandular</i>	Papilloma Adenoma	Carcinoma Adenocarcinoma
* <u>Connective Tissues</u> <i>Adipose</i> <i>Fibrous</i> <i>Cartilage</i> <i>Bone</i> <i>Smooth muscle</i> <i>Striated muscle</i>	Lipoma Fibroma Chondroma Osteoma Leiomyoma Rhabdomyoma	Liposarcoma Fibrosarcoma Chondrosarcoma Osteosarcoma Leiomyosarcoma Rhabdomyosarcoma
* <u>Neuro-ectodermal</u> <i>Nerve cells</i> <i>Melanocytes</i> <i>Meninges</i> <i>Nerve sheaths</i>	Ganglioneuroma Pigmented naevus Meningioma Neurofibroma	Neuroblastoma Malignant melanoma Neurofibrosarcoma
* <u>Hemopoietic & Lymphoreticular</u>		Leukemias Lymphomas
* <u>Blood vessels</u>	Hemangioma	Hemangiosarcoma
* <u>Lymph vessels</u>	Lymphangioma	Lymphangiosarcoma
* <u>Germinal & Embryonic cells</u>	Benign Teratoma	Malignant Teratoma Seminoma
* <u>Placenta</u>	Hydatiform mole	choriocarcinoma

*** Aetiology of cancer:****[I] Onchogenesis :**

Agents that damage genes that initiate the malignant Transformation.

- (1) **Chemical Agents.**
- (2) **Physical.**
- (3) **Viruses**
- (4) **Diet**
- (5) **Idiopathic**

[II] Another Category:

Agents not damage genes but enhance the growth of Tumour cells

- e.g. Hormones. (1) **Oestrogen** stimulate growth of cancer Breast
(2) **Androgen** stimulate growth of cancer Prostate

**(1) Chemical Agents:**

- a. **Tobacco smoke** (mainly of cigarettes)
e.g cancer lung, esophagus, urinary bladder and pancreas.
- b. **Occupational Agents:**
e.g Asbestos → Mesothelioma of lung with insulation workers.
- Benzidine → Transitional Cell Carcinoma of urinary bladder with petrochemical
- Diesel exhaust → Bronchial Carcinoma with bus-garage worker .
- Soot → Squamous Cell Carcinoma (skin) with sweepers.

(2) Physical Agents:

- a. **Mechanical irritation:**
e.g. gall stanes → cancer gall Bladder .
- b. **Ionizing radiation:**
e.g α & β rays → cancer in man and Animal .
- c. **Ultraviolet rays:**
e.g. cancer skin .

(3) Viruses:

- a. **Human papilloma viruses :**
Sexually Transmitted → Cervix & Anus .
- b. **Hepatitis B & C** → Hepatocellular Carcinoma.

(4) Diet :

- a. Fat → Cancer colon and rectum.
- b. Alcohol → Cancer upper digestive tract and hepatocellular Carcinoma.

(5) Idiopathic.

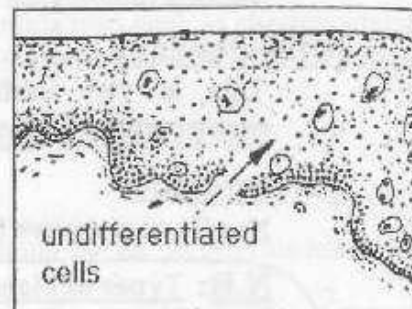
* Cancer development :

- (1) *Hyperplasia* : The cells look normal but reproduce to too much cells.
- (2) *Metoplasia* : Change of type of epithelium into another type.
- (3) *Dysplasia* : The cells becomes a typical in size & shape.
- (4) *In situ* : The cells not invade the basement membrane.
- (5) *Invasion* : The cells begain to invade the neighboring tissue.
- (6) *Metastasis* : The cells tend to reach blood and lymphatics

* Cancer grading :

Grading in a measure for tumor aggression.

- (1) **Well differentiated tumors** : The least aggression .
- (2) **Moderatly differentiated tumors.**
- (3) **Poorly differentiated tumors** : The most aggression



* Cancer spreading :

(A) Properties that allow Metastasis:

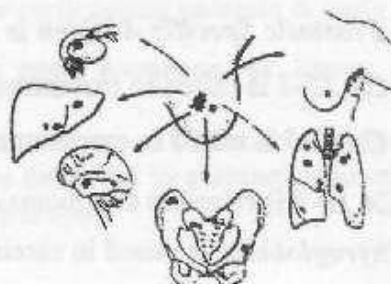
- 1- *Defective cell adhesions* : Cancer cells lack of adhesive proteins which bind the cells to another.
- 2- *Tumer Angiogenesis* : Cancer cells access to circulation through newly formed capillaries.
- 3- *Production of proteolytic Enzymes* which digest the basement membrane allowing invasion.

(B) Mode of Metastasis :

- 1- Local spread : To neighboring Organs & Tissnes .
- 2- Lymphatic spread: 2 types .
 - a- Permeation: Malignant cells invade the endothelium of lymphatics then grow inside the lymph vessels.
 - b- Embolization : Malignant cells carried as an emboli to draining L.Ns.
- 3- Blood spread: Malignant cells invade to cappillaries as an emboli to lung, bone, liver & Brain.
- 4- Tronscoelomic spread : Travel along cavities

* Cancer staging : (T.N.M)

- (T) = Extent of lry **Tumor** in size and depth.
- (N) = Presence or absence of L.Ns.
- (M) = Presence or absence of Metastasis.



* Diagnosis of malignant tumors :

[A] Screening :

Some people may have a higher risk of developing a certain malignant tumour. So certain screening programmes are done to detect the neoplasm as early as possible.

A Common Example is to do Soft Tissue Mammography for females who have a higher chance of developing breast cancer.

[B] Radiological :

various radiological techniques including contrast studies, ultrasound & CT

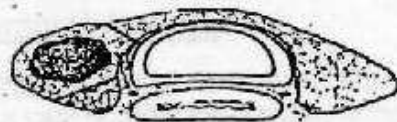
[C] Endoscopy

This is very useful for diagnosis of most lesions of the respiratory, gastrointestinal and urinary.

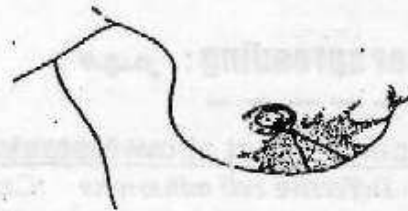
[D] Histology

Needle or operative biopsies essential for tissue diagnosis.

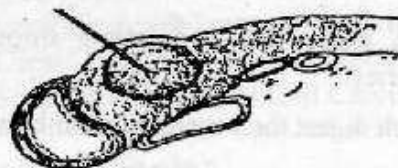
N.B: Types of biopsy:



① Excisional



③ Incisional



② Aspiration

[E] Cytological Examination :

Fine needle aspiration cytology is now a well established line of investigation which is commonly used to diagnose lesions of the Thyroid, Breast ...etc

[F] Tumours Markers :

Many malignant Tumours secrete certain oncofetal proteins which can be established. This may help in the diagnosis of certain tumours

Examples include

- ① α -feto-protein is raised in hepatocellular carcinoma & testicular tumor.
- ② CEA (Carcino-Embryonic Antigen) is raised with cancer colon.
- ③ Prostatic Specific Antigen is raised in Prostatic carcinoma.
- ④ CA 15-3 is raised in carcinoma of the Breast.
- ⑤ CA-125 is raised in carcinoma of the Ovaries.
- ⑥ CA 19-9 is raised in carcinoma of colon.
- ⑦ Thyroglobulin is raised in carcinoma of thyroid.

*** Treatment Of Cancers :****[Modalities for Treatment of Patient with Cancer]****(A) Early (equivalent terms = loco-regional , potentially curable, operable)cancer.**

- There is one evidence of distant spread .
- Cure is possible if this local disease is eradicated .
- Treatment is radical, i.e., aims at cure.
- Treatment is, essentially, by loco-regional modalities, i.e., surgery , radiotherapy , or by a combination of both .
- Adjuvant (complementary) treatment of systemic modalities such as chemotherapy is indicated if there is a high possibility of systemic microscopic spread in distant sites .

(B) Late (equivalent terms = systemic, incurable, inoperable) cancer.

- There are distant metastases.
- Cure is not possible .
- Treatment aims to palliate of the patient's symptoms so as to provide him with a reasonable life quality.
- Treatment is also essentially by systemic modalities as chemotherapy and hormones.
- Surgery or radiotherapy is sometimes needed to palliate local symptoms.

⇒ The individual modalities of treatment include:**1) Surgery:**

- **Primary tumour:** Radical surgery aims at excision of the primary tumour with as wide a safety margin.
- **Lymph nodes:** The treatment of lymph nodes varies from one tumour to another
 - (1) *G.I.T. malignancies* : lymph nodes are routinely resected
 - (2) *Breast cancers* : they are either resected or irradiated
 - (3) *Head and neck malignancies* : the nodes are treated only if they prove to contain malignant deposits.
- **Advantages** : Surgical excision is both quick and effective.
It accounts for the largest number of cures.
- **Disadvantages** : Surgery may produce functional and cosmetic disabilities.

2) Radiotherapy:

- **Indications:** (1) Cancer of the larynx so as to preserve the voice.
(2) Early Hodgkin's disease' early cancer prostate & early cancer breast
- **Method** : Powerful X-rays, gamma rays, electrons, or heavy particles are directed to the tumour.
The radiation may be aimed at a tumor from outside the body (teletherapy), or it may be delivered by placing radioactive needles at the cancerous site (brachytherapy).

- **Advantages:**

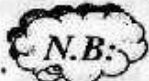
- (1) Curing the cancer without sacrificing the patient's ability to function.
- (2) Radiation can destroy microscopic extensions of cancerous tissue around that a tumour that a scalpel might miss.
- (3) Radiation is a safer option for older.

- **Disadvantages:**

- (1) While some tumours as squamous cell carcinoma are sensitive to irradiation, adenocarcinoma is much less sensitive.
- (2) Radiation is commonly associated with burns of the skin or enteritis, which are difficult to treat.
- (3) Compared to surgery, radiotherapy is slower as it usually takes 5 to 8 weeks.

3) Chemotherapy:

- (1) Main line of treatment of leukaemias.
- (2) Metastases.
- (3) Adjuvant to surgery in early cases where microscopic metastases.



Better results are obtained from combination chemotherapy rather than using agent.

- **Advantages:** The drugs travel the circulation and can reach malignant cells anywhere in the body. Many malignancies including leukaemias, lymphomas and testicular cancer are now successfully treated by new combination of chemotherapy.
- **Disadvantages:** The available chemotherapeutic drugs often kill many healthy cells and thus bring on serious effects, so causes anemia, leucopenia and thrombocytopenia.

4) Hormone therapy:

Hormone-blocking and hormone-supplementing therapies affect the rate at which tumor cells grow, and multiply. Examples are :

- **Anti-estrogen** for women with cancer breast that is positive for oestrogen receptors.
- **Anti-androgen** for men with cancer prostate.
- **Thyroxin** to suppress TSH for patient with papillary carcinoma of thyroid.

5) Immunotherapy:

- **Non-specific.** The tuberculosis vaccine BCG stimulates the immune system in general.
- **Specific.** This method is still of limited use.
Administration of Monoclonal antibodies from a single clone of lymphocytes that have been stimulated by a specific protein of the cancer cells.

II Transplantation

Basic Immunology

* Tissue Typing :

Glycoprotein molecules on the surface of all somatic cells act as "self- markers" which are responsible for triggering the immune reaction leading to allograft rejection. These molecules were originally detected on leukocytes and are therefore, named *Human leucocyte antigens (HLA)*.

* Histocompatibility complex :

These HLA Antigen are genetically controlled by loci on the short arm of chromosome 6. This area on chromosome 6 is termed the *Major Histocompatibility Complex*.

Transplantation Immunology

* Pre-transplantation Assesement : (Histocompatibility Test)

① Serological Cross Match

To Test the recepiant serum for cytotoxic antibodies against the donor cells .

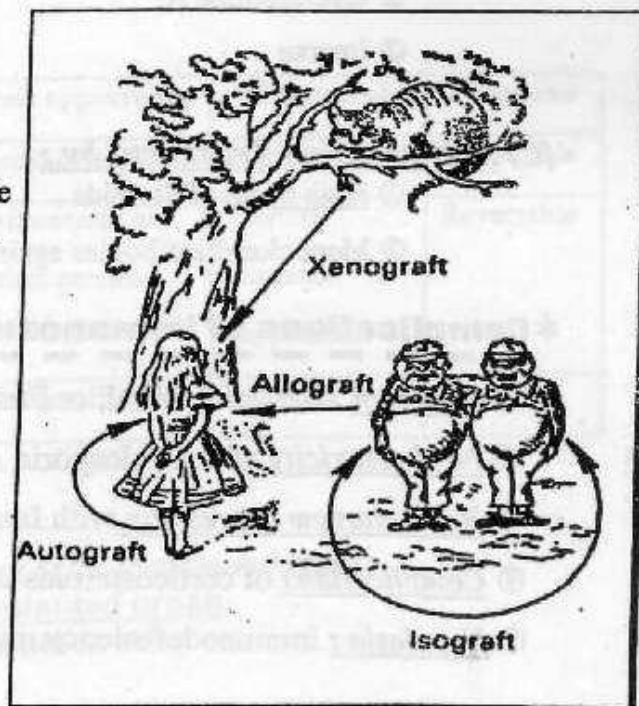
② HLA Matching Test :

for Donor & Recepiant tissue to minimize genetic disparity & later graft rejection .

* Types of Graft

(For Transplantation) :

- ① Autograft: same individual .
- ② Allograft: same species .
- ③ Isograft : identical twins.
- ④ Xenograft: different species .



*** The Donors :**

① Living donor : only if paired organ or vascularised segmental part like the liver.

② Cadaver donor : with Proved Total brain death by :^{2b}

- a. Deep coma (No response to external stimuli).
- b. Bilateral dilated fixed pupils .
- c. Absence of all reflexes .
- d. Inability to maintain the vital signs for 3 minutes without artificial means.
- e. Flat EEG in all channels .

*** Organ preservation :** By ^{2b}

- ① Cooling (surface or perfusion) to ↓ tissue metabolism.
- ② Perfusion of a special solution to maintain a normal metabolic activity .

*** Immunosuppression :** To prevent Rejection

(A) Induction immunosuppression: 1st 2 weeks after Transplantation to prevent lymphocytes from attacking the transplant by :

- ① Large doses of Corticosteroids .
- ② Azathioprine .
- ③ Anti-thymocyte globulin .

(B) Maintenance Immunosuppression by :

- ① Small doses of steroids
- ② Cyclosporine A.
- ③ Imuran

(C) Anti-rejection Treatment by :

- ① High doses of Steroids .
- ② Monoclonal antibodies again T-lymphocytes carrying CD3 receptors.

*** Complications of Immunosuppression :**

- ① Infection : Bacterial, Viral, or Fungal in U.T., Surgical wounds or Catheters .
- ② Nephrotoxicity with Cyclosporin A.
- ③ Bone marrow depression with Imuran .
- ④ Complications of corticosteroids .
- ⑤ Neoplasia : immunodeficiency may predispose to cancer development .

The Rejection Process

[1] Cellular Mechanism :

- (a) The graft Allo-antigens are shed in a cellular or soluble form to the recipient's immune system and are then processed by the macrophage and dendritic cells .
- (b) The Initial Recipient's response is activation and proliferation of T-helper cells .
- (c) T-helper cells produce interleukin 2 (IL-2) which stimulates the activation and proliferation of cytotoxic T-lymphocytes.
- (d) Stimulated cytotoxic T-lymphocytes attack the transplanted tissues directly and cause damage to the cells carrying the foreign HLA antigens.

* These steps can be summarized as following ↗

Allo-antigen $\xrightarrow[\text{Macrophage}]{\text{Process by}}$ T-helper $\rightarrow$ Interleukin 2 $\rightarrow$ Cytotoxic T lymphocytes

[2] Humoral Mechanism. The present of complement-fixing cytotoxic antibodies, prior to transplantation, produces hyperacute allograft rejection by attacking vascular endothelium in the transplanted organ leading to platelet aggregation and thrombosis .

* Typing Graft Rejection :

Type	Onset	Mediators	Graft appearance	Treatment	Prognosis
1) Hyperacute	Immediate	Humoral	Flaccid, cyanotic	Anti-rejection	Reversible
2) Acute	First 6 months	Cellular and humoral	Graft-oedema and cortical necrosis	Steroids immuno-suppression	Reversible
3) Chronic	Variable	Cellular	Shrunken, fibrotic	Resistant	Bad

* Diagnosis of Rejection :

① Sonar, C.T. and MRI :

Can assess the size and gross morphology of the transplanted organ .-

② Functional assessment of the Transplanted organ:

(e.g.) Kidney function test, liver function test ... etc.

③ Estimation of the level of

Cytotoxic lymphocytes and antibodies in the recipient serum.

④ C.T. guided biopsy :

From the transplanted organ then histopathological examination to ensure the type of rejection.

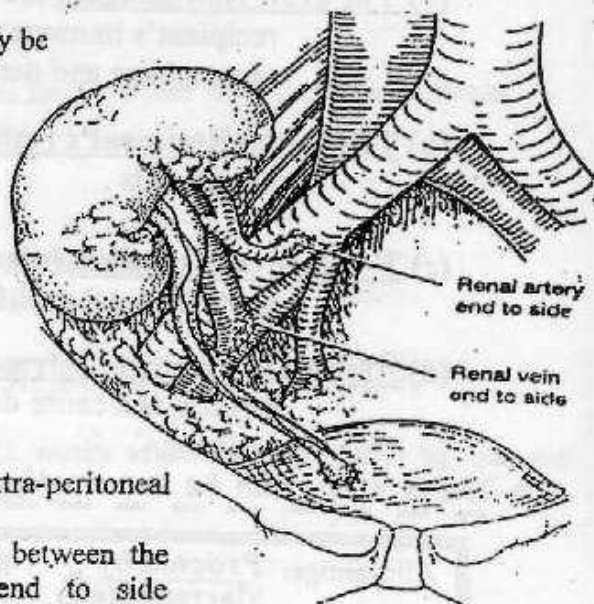
Examples of**Organs Transplantation****[I] Renal Transplantation :****★ Indications :**

All cases of end-stage renal diseases which may be secondary to :

- ① Glomerulonephritis (most common cause).
- ② Hypertension.
- ③ Diabetes.
- ④ Pyelonephritis.
- ⑤ Polycystic disease.
- ⑥ Lupus nephritis.
- ⑦ Obstructive uropathy.
- ⑧ Congenital nephrotic syndrome.

★ Technical considerations :

- The grafted kidney is placed in an extra-peritoneal position in the iliac fossa.
- The Arterial Anastomosis : is performed between the renal artery & external iliac artery (end to side anastomosis).
- The Venous anastomosis : is performed between the renal vein and external iliac vein (end to side anastomosis).
- The ureter of grafter kidney is anastomosed to patient's urinary bladder.

**★ Complications :**

- ① Complications of immunosuppression (see before)
- ② Recurrence of original disease in the grafted kidney.
- ③ Technical complications as vascular occlusion 2 stenosis, urinary leakage, ureteric stricture and wound infection.

[II] Hepatic Transplantation :**★ Indications :****(1) In children :**

- Cirrhosis due to biliary atresia, congenital hepatic fibrosis and congenital hepatic cirrhosis.
- Metabolic disorders as glycogen storage disease, alpha 1 antitrypsin deficiency, galactosemia and histiocytosis.

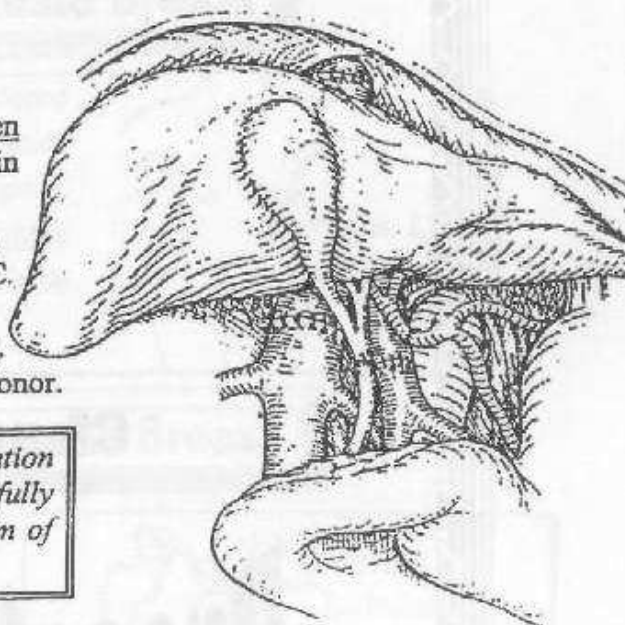
(2) In adults :

- Cirrhosis : Primary and secondary biliary cirrhosis, chronic active hepatitis, sclerosing cholangitis and alcoholic cirrhosis (relative indication).
- Metabolic : Hemochromatosis, Wilson's disease and Budd-Chiari syndrome.
- Neoplastic : Fibrolamellar tumor and primary small intracapsular hepatocellular carcinoma on top of liver cirrhosis. The tumor should be localized and there should be no evidence of metastases. .

★ Technical Consideration :

- The liver of the recipient is removed then the grafted liver (cadaveric) is placed in same position then.
- The following anastomoses are performed.
 - Supra-hepatic & Intra-hepatic I.V.C.
 - Portal vein of recipient to donor.
 - Hepatic artery of recipient to donor.
 - Common bile duct of recipient to donor.

N.B.: Nowadays, segmental liver transplantation from living donors are being successfully performed. This will overcome the problem of shortage of available liver donors.

**★ Complications :**

- ① Complications of Immune suppression (as before)
- ② Recurrency of the original disease of grafted liver.
- ③ Technical complications : as vascular occlusion or stenosis, bleeding, bile duct leakage and/or stenosis.

[III] Pancreatic Transplantation :**★ Indication :**

Type I insulin dependent diabetes mellitus with renal failure, so combined (renal & pancreatic transplantation) is performed.

★ Technical considerations :

Whole or segmental pancreatic transplantation is performed with venous anastomosis to portal or systemic venous circulation.

★ Complications :

- ① Complications of Immune suppression (as before)
- ② Pancreatitis.
- ③ Technical complications : as vascular occlusion or stenosis.

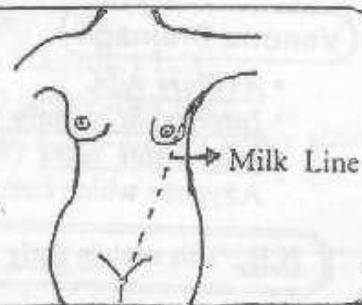
Chapter [9]

Breast Diseases

The Breast Diseases

Development Of The Female Breast

The Breast is a modified sweat gland which is developed from an Ectodermal ridge which extends between the anterior pectoral fold & the groin. Normally it disappears all through except in front of chest where solid columns of epithelia pass deeply → Canalized → Milk duct.



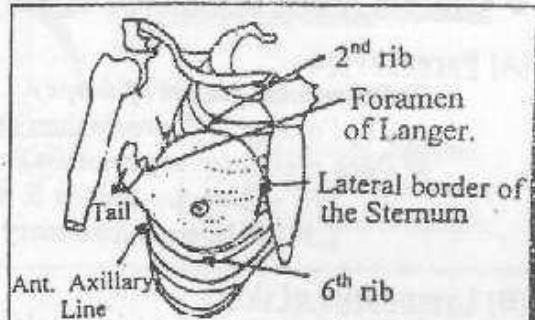
Surgical Anatomy of the Female Breast

* Extent

- Above : At 2nd rib.
- Below : At 6th rib.
- Medially : At lat. Border of sternum.
- Laterally : At ant. Axillary Line.

N.B. : Axillary Tail of Spence : (3rd rib)

It is prolongation from upper outer part of gland up to axilla it consider the only part which is deep to pectoral fascia through Foramen of Langer

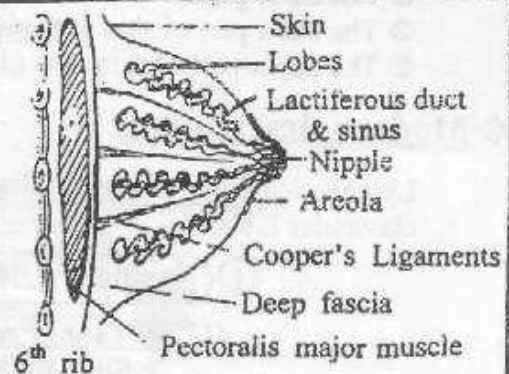


* Areas : [6 Areas]

- Upper Inner quadrant.
- Upper outer quadrant
- Retroareolar part
- Lower inner quadrant.
- Lower outer quadrant.
- Axillary tail.

* Architecture :

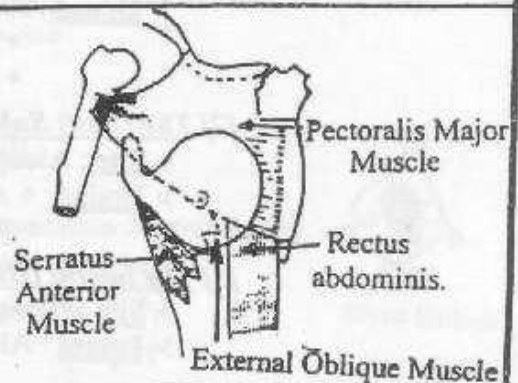
- Breast consists of many Lobules which is aggregated → (15-20) Lobes which arranged in radiating manner → Single duct → Nipple.
- It is attached to underlying fascia by band of fibrous tissue [Cooper's Ligament]. This ligament can be involved in fibrotic lesions leading to skin dimpling



* Muscle Floor :

It lies on 3 Muscles

- Pectoralis Major Muscle.
- Serratus Anterior Muscle (Inf. Lateral)
- External Oblique Muscle (Inf. Medial)

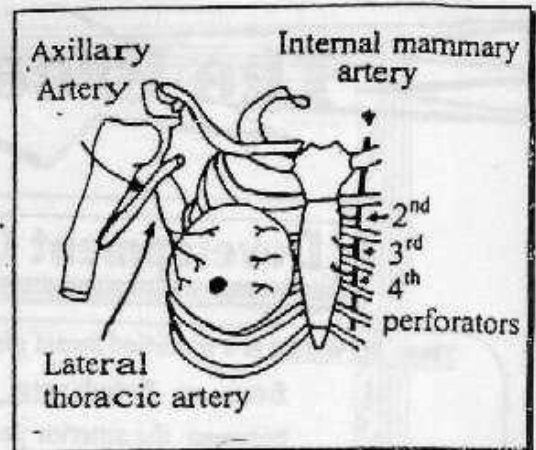


* **Blood Supply :**(A) **Arterial Supply**

- Axillary artery → Lat. Thoracic artery
- Internal Mammary artery → 2,3,4 perforators.
- Intercostal arteries (Perforators).

(V) **Venous Drainage**

- Axillary vein.
- Internal Mammary vein.
- Intercostal veins (which drained into Azygoze which communicates valveless vertebral veins)



N.B.: This explain Early vertebral metastasis with cancer breast

(++)* **Lymphatic drainage :**◇ **Classic Description :**[A] **Parenchyma :**

- ① Subareolar plexus of sappey :
For nipple & areola then drains to deep plexus.
- ② Deep plexus (over pectoralis)
For subareolar plexus & deep part of the gland then drain to axillary L.Ns & Internal mammary through the pectoralis muscles.

[B] **Lymphatics of skin :**

- ① The outer part of skin over gland to Axillary L.Ns.
- ② The inner part of skin over gland to Internal mammary L.Ns.
- ③ The upper part of skin over gland to supraclavicular L.Ns.

◇ **Modern description :**

Lymphatics drain through axillary L.Ns → internal mammary L.Ns → supraclavicular L.Ns.

(I) **Axillary L.Ns (75%)**[1] **The (Ant.) Pectoral group :**

- Site : Under cover the pectoralis major.
- Drains : ♦ Chest wall.
- ♦ Whole breast except Tail.
- ♦ Ant. Abdominal wall above umbilicus.

[2] **The (Post) Subscapular group :**

- Site : Along post, axillary fold.
- Drains : ♦ Axillary tail.
- ♦ Post, abdominal wall above umbilicus.

[3] **The lateral (Humeral) group :**

- Site : Along upper part of humerus.
- Drains : All the upper limb.

[4] The central group :

- > Site : Central part of Axilla.
- > Drains : [1], [2], [3].

[5] The Apical group :

- > Site : Extreme apex of Axilla.
- > Drains : [1], [2], [3], [4].

(II) **Other Associated L.Ns (25%)**

- [1] Internal Mammary L.Ns Drain Axillary L.Ns.
- [2] Supra-clavicular L.Ns Drain Internal Mammary L.Ns.
- [3] Interpectoral L.Ns of Rotar Between 2 pectoral muscles.
- [4] Posterior Intercostal L.Ns Along Neck of ribs & have a minor share.

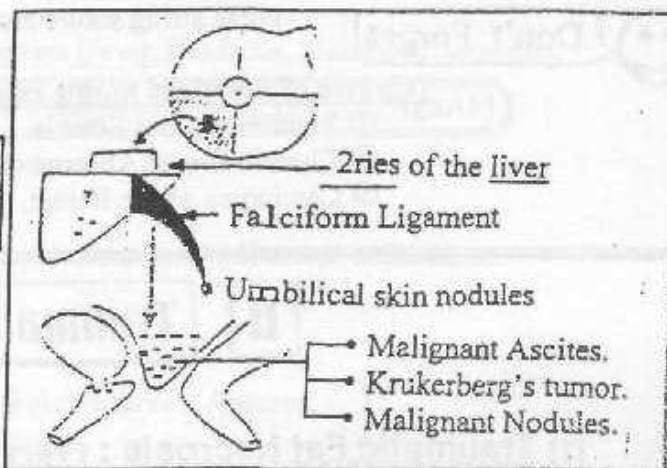


- [1] Lymphatics drains Through axillary L.Ns (75%) → Internal mammary L.Ns → Supra-clavicular L.Ns

- [2]  Connection of the lymphatics of the lower inner quadrant of the breast with the peritoneum.

Lymphatics pierce rectus sheath → spread to Liver leading to liver nodules. Then through (falciform ligament) → umbilical nodules (Josef sister's nodules).

N.B.: Some malignant cells will lead to malignant Ascites, Krukenberg's tumor and malignant nodules in the Douglas pouch.



- [3] From prognostic point of view, Axillary L.Ns are classified by Pectoralis minor muscle into 3 levels
- level I → L.Ns *below* the muscle
 - Level II → L.Ns *behind* the muscle
 - Level III → L.Ns *above* the muscle

Disorders of the Female Breast



I Congenital Anomalies

A- The Breast :

- ① Amazia : Absence of breast (Unilateral or Bilateral).
- ② Polymazia : Accessory breast along milk Line.
- ③ Micromazia : Small breast. → Treated by : [Augmentation Mamoplasty].
- ④ Macromazia : (Diffuse Hypertrophy of the breast) Treated by : [Reduction Mamoplasty].



B- The Nipple :

- ① Athelia : Absence of nipple (very rare).
- ② Polythelia : Accessory nipple along milk line
- ③ Congenital Retraction of the Nipple : →

It must be differentiated from Acquired Retraction of the

	☆ Congenital Retraction	☆ Acquired Retraction
• <u>History</u> :	• Since birth.	• Recent.
• <u>Side</u> :	• Bilateral.	• Unilateral.
• <u>Mass</u> :	• No breast mass	• Presence of breast mass
• <u>Sulcus</u> :	• Absent	• Present

Treatment of congenital nipple retraction :

- ① Frequent digital drawing of the nipple.
- ② Ashford's operation :

Purse string suture around the Nipple →



Don't Forget

[Causes of Acquired nipple retraction] "Due to Excessive fibrosis."

- ① Mammary Duct Ectasia.
- ② Chronic Breast Abscess.
- ③ Carcinoma of the Breast.

II**Traumatic Diseases****[1] Traumatic Fat Necrosis : (Very rare)**

- It may follow a blow → Death of some Fat cells → Liberation of fatty acids which combine with calcium from local tissue fluid → Calcium Soaps

N.B. : Other causes of Traumatic fat necrosis :

Direct Trauma e.g. Needle biopsy
or Indirect trauma e.g. sudden contraction of pectoralis.

- Calcium soaps : • Cyst containing "Thick Oily Fluid".
- Hard mass If we Do biopsy the cut section will show "Characteristic Chalky white appearance".
- Treatment : Excisional biopsy.

[2] Breast Haematoma :

- It may follow A Blunt Trauma → Blood clot → Organization → Fibrosis
- Fibrosis → Hard mass.
- Treatment : Excisional biopsy.

[3] Traumatic mastitis : e.g. ill fit braces.**[4] Cracked nipple : From bad hygiene or from baby's mouth.****[5] Milk fistula : Due to incision or injury of milk duct or rupture abscess. Treated by fistulectomy.**

III Inflammatory Diseases

Ⓐ Acute Inflammatory Diseases

[1] Acute Lactational Mastitis & Acute Breast Abscess

Mastitis from milk engorgement

- * **Incidence** : 1st month of 1st lactation.
- * **Aetiology** : Due to obstruction of duct by dry inspissated milk or epithelial debris.
- * **Clinical Picture** :
 - **Symptoms** : • **General** : Toxic symptoms [Fever, Headache, Malaise & Anorexia]..
 - (N.B. : Fever is due to absorption of Milk protein (AgxAb))
 - **Local** : Dull aching pain.
 - **Signs** : • **Diffuse** Tense & Tender.
 - **No Physical** signs of inflammation, i.e. No Hotness or Redness.
 - **No**, Axillary L.Ns.
- * **Fate** : [If Neglected] → Acute Bacterial Mastitis or Acute Breast Abscess.

Acute Bacterial Mastitis

- * **Incidence** : 1st month of 1st lactation i.e. Fate from milk engorgement.
Or when baby is at 6 Months, i.e. Development of Incisors.
- * **Aetiology** :
 - **Predisposing factors** : • **Mastitis** from milk engorgement.
 - **Abrasions** of nipple e.g Cracks or Fissures.
 - **Lack** of breast hygiene.
 - **Organism** : Staphylococcus aureus (Gram +ve).
 - **Route of entry** : Organism from baby's Mouth.
Much less common (Blood born infection).
 - **Pathology** : Milk engorgement+ Staph. Infection → Diffuse Mastitis → Pus i.e. Acute Breast abscess.
- * **Clinical Picture** :
 - **Symptoms** : • **General** : Toxic symptoms [Fever, Headache, Malaise & Anorexia].
 - (N.B. : Fever is due to absorption of Organism (AgxAb))
 - **Local** : Dull aching pain but Gets worse.
 - **Signs** : • **Diffuse** Tense & Tender.
 - Physical signs of inflammation. e.g. Redness & Hotness of Skin.
 - Axillary L.Ns : Firm & Tender (Non specific).

- * **Fate** : [If Neglected] $\Rightarrow$
Acute Breast Abscess

Acute Breast Abscess

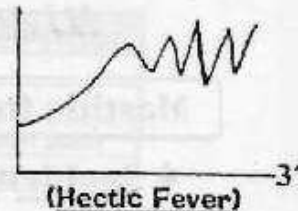


Abscess

* Clinical Picture :

- **Symptoms** : • **General** : Toxic symptoms [F.H.M.A.].
(Fever, Headache, Malaise & Anorexia).

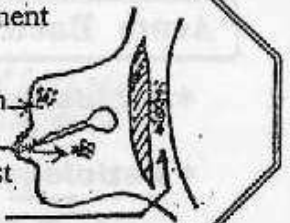
N.B. : Fever is Hectic i.e. Fluctuant and not reach the basal line at same day.



- **Local** Throbbing pain which more at night
- **Signs** : • **Localized** : Tense & Tender.
 - **Physical signs** of inflammation.
e.g. Redness & Hotness of Skin.
 - **Axillary L.Ns** : Firm & Tender (Non specific).
 - **Purulent** discharge
 - **Pitting oedema** of skin overlying the abscess.
 - **Fluctuation** is very late.

- N.B.** : ① Surgeons not wait for fluctuation for management
② **Types of Breast Abscess** :

- [A] **Supra (pre) mammary abscess** : just under skin
[B] **Intra-mammary abscess** : inside breast tissue.
[C] **Retro (post) mammary abscess** : between breast tissues & chest wall.



	* D.D. Between :	Acute Bacterial Mastitis	Mastitis Carcinomatosa
History	▪ Onset & Course ▪ Fever	• Acute onset & Rapidly progressive course. • High grade fever.	• Gradual onset & Slowly progressive course. • Low grade fever.
Inspection	▪ Site ▪ Skin over	• Sector of breast. • Firey red.	• >1/3 of breast. • Dusky red.
Palpation	▪ Tenderness ▪ Axillary L.Ns	• Markedly tender. • Firm & Tender.	• Mild tender. • Hard & Not Tender.
Treatment	▪ Treatment by A.B	• Cured or form abscess	• No response during 1st week $\rightarrow$ Biopsy.

Treatment of Acute Lactational Mastitis & Acute Breast Abscess

A Prophylactic treatment

- I **Correct** Hygiene of breast during lactation.
- II **IF Nipple Cracked :**
 - ① **Stop** Lactation & Elevate Breast by Braces.
 - ② **Wash** with Boric lotion + **Paint** the nipple with Tinc. Benz oic Compound.
 - ③ **Antibiotics.**

B Active treatment

I Stage of Milk Engorgement & Acute Bacterial Mastitis

i.e. Before Suppuration [No Abscess]

- ① **Local Heat** "Hot application".
- ② Support the Breast "strapping".
- ③ An Antibiotic against staphylococci e.g. **Flucloxacillin** or **Cephalosporin**.
- ④ **The advisability of weaning :**
 - ⊙ If Baby > 9M → **Stop feeding.** The agent in common use is "**PARLODEL**" 2.5 mg twice/day.
 - ⊙ If Baby < 9M → Continue feeding with healthy breast & regular evacuation of diseased one by using a **Pump**.

II Stage of Acute Abscess Formation

i.e. After suppuration [Don't wait for fluctuation]. (127 pgs)

- **Anaesthesia :** General anaesthesia.
- **Incision :**

N.B. : Incision & drainage according to type of abscess :

① Supra (pre) mammary abscess :

Incision any where. →

② Intra-mammary abscess : it may be

- a. **Radial :** Radiating from areolar →
- b. **Circum-areolar :** at margin of areola.

Incision at skin 1st then radial incision is done at breast tissues. So more cosmetic →

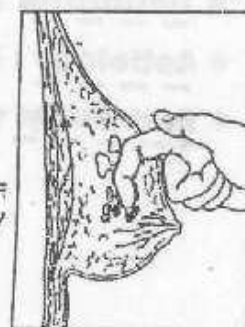
c. **Counter incision :**

If the abscess at upper 1/2, so a 2nd incision is done opposite 1st one & dependent. →

③ Retro (post) mammary abscess :

Incision in sub-mammary fold. →

- **Technique :**
 - ① The surgeon's finger breaks all loculi to form single cavity
 - ② Pus evacuation for culture & sensitivity.
 - ③ Drain is brought out through the most dependent part.



[2] Acute Non Lactational Mastitis

- ① Infected Haematoma.
- ② Infected Tumors.
- ③ Mastitis from local irritation, e.g. Ill fitting braces. i.e. Traumatic mastitis.
- ④ Mastitis Neonatorum (Female and Male).
 - It is due to retention of mother hormones i.e. (maternal prolactine) which stimulate lactation in infant.
 - C/P : Swollen breasts on 3rd, 4th day with few drops of milk (witch's milk).
 - It subside 2-3 weeks.
- ⑤ Mastitis of Mumps (usually uni & common with female).
- ⑥ Mastitis of puberty (Male only)
 - The condition affects adolescent boys → pain + swelling of breast. Which becomes indurated but (Suppuration Never occur).
 - The condition subsided in 2-3 weeks.

(B) Chronic Inflammatory Disease

[1] Mammary Duct Ectasia [Plasma Cell Mastitis]

- * Definition : Dilatation of major ducts of the Breast.
- * Aetiology : Unknown.
- * Pathology : Chronic inflammation of duct system leads to Dilatation of major ducts which are • Filled by : Creamy secretions.
(Atrophic epithelium + Fatty material).
• Surrounded by : Plasma cells
So (Called Plasma Cell Mastitis).
- * Clinical Picture :
 - Age : Around or After menopause.
 - Mass : Hard mass, may associated with → Retraction of nipple, peau d'Orange ... etc
So Similar to cancer breast.
 - Discharge : Green paste discharge.
- * Treatment : Excision & Biopsy (To exclude malignancy).

[2] Chronic Breast Abscess

Non specific (Chronic Pyogenic Breast Abscess)

- * Definition : Fate of Improper treatment of Acute Abscess.
- * Aetiology : Prolonged use of Antibiotics → Killing of bacteria → Sterile pus → Antibioma
- * Pathology : • Cavity : Containing sterile pus
• Wall : Thick fibrous wall.



* **Clinical Picture :**

- **History of** (Acute Abscess).
- **Mass** → **Hard** mass, may associated with → Retraction of nipple, peau d'orange ...etc.
- So Similar to Cancer breast.

* **D.D.:**

	Chronic Abscess	Cancer Breast
• Toxaemia.	• Low grade fever.	• Absent
• Post-surface.	• Rounded.	• Flat.
• History of AB	• +ve	• -ve
• Paget's test	• may +ve	• -ve

* **Treatment:** Excision & Biopsy (To exclude malignancy).

Specific[A] **Tuberculosis (T.B.):*** **Definition :**

A Rare disease associated with Active pulmonary T.B.

* **Aetiology:**

Tubercle Bacilli (T.B.).

* **Pathology:**

T.B. Granuloma.

* **Clinical Picture :**

- **History of** (Night sweat, Night fever, Loss of weight & Loss of appetite).
- **Mass** : Multiple nodules of the Breast.
- **Axillary L.Ns** : Enlarged & matted.

* **Treatment:** Anti T.B. drugs + Mastectomy for Resistant cases.

[B] **Syphilis (S):**

- ♦ It may be Iry S : Chancer in nipple & areola from S child (the chancer is painless indurated).

2ry S : Condyloma in submammary fold + generalized lymphadenopathy.

3ry S : (Rare) with gumma at skin + No L.Ns enlargement.

- ♦ **Treatment** : Anti-syphilitic drugs.

Mondor's disease

* **Definition** : It is a thrombophlebitis of superficial veins the breast.

* **Aetiology** : Unknown.

* **D.D.** : From occult carcinoma.

* **Treatment** :

Rest of arm (to restrict movement) the condition usually subside Spontaneously.

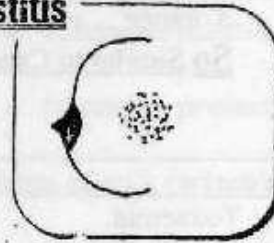
IV Fibrocystic Disease of the Breast

Chronic Interstitial Mastitis

Other Names

- Mammary Dysplasia.
- Fibroadenosis.
- Mastopathy.
- ANDI

[Aberration of Normal Development & Involution].



* Incidence :

This is The Most frequent disorder of the breast. The upper outer quadrant of the breast is the commonest site of affection.

* Aetiology :

[Unknown] but may be due to Oversensitivity of oestrogenic receptors.
i.e. [Relative Hyperoestrogenaemia].

* Pathology :

[An Image of pathological action of Oestrogen on Breast].

- N/E picture : • Site : Localized or Diffuse.
- Side : Unilateral or Bilateral

- Microscopic picture : [Panplasia]

- Adenosis : ↑ Number of acini.
- Epitheliosis : Hyperplasia of epithelial lining the ducts → **Atypical Hyperplasia** → Pre-cancerous.

N.B. : Duct papilloma :

It is a localized form of Epitheliosis

- Fibrosis : Fibrous tissue replaces the fat & the elastic tissues. i.e. **Sclerosing Adenosis**

N.B. : Fibroadenoma :

It is a localized form of Adenosis and Fibrosis.

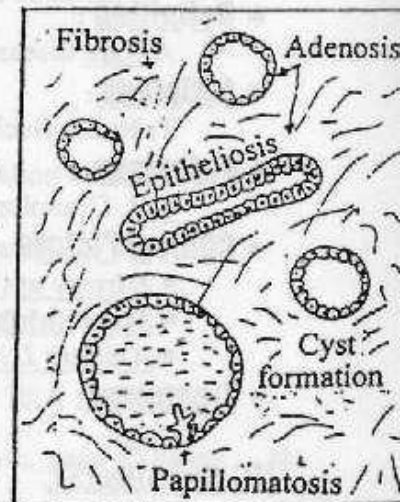
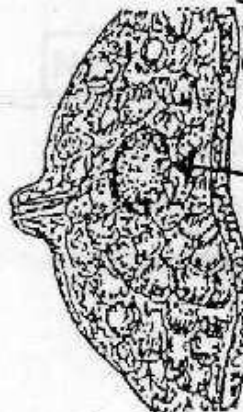
- Cyst Formation :

- (A) Microcyst : Degenerating cyst.
- (B) Macrocyst : Retention cyst due to obstruction by :

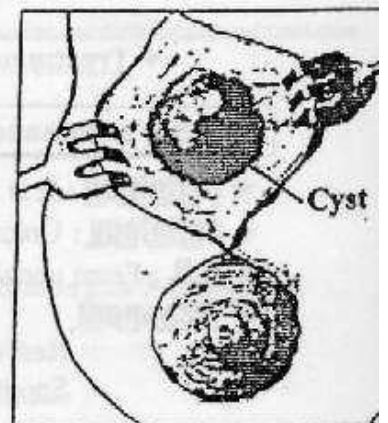
- Epitheliosis from inside.
- Fibrosis from outside.

Cyst of Bloodgood

N.B. : Sometimes Papillomatosis occur inside the cysts.



(Panplasia)



Blue Domed cyst of Bloodgood

* Clinical Picture : [May be Asymptomatic]

- Age : After puberty or before menopause
- Symptoms : • Pain (→ ←) : Dullache. ↑ before. ↓ after menses.

N.B. : ① This pain stop with pregnancy
② If pain marked called **MASTALGIA**

- Discharge : Serous, Green or Dark.
- Mass : a. Painful and Fixed to breast tissues.
b. Away from Areola (V. Important for →).

(D.D. from Duct papilloma)

- Signs : • Breast : a. Tender & Firm or Fine nodules by Tips of fingers →
b. Discharge : By patient herself.
c. Mass : Away from the Areola.



N.B.: The mass may be Localized or Diffused or Sector because of changes in (Estrogen Receptors).

- Axillary L.Ns : Firm & Tender [Never Hard].

N.B.: L.Ns enlargement due to chemical irritation by abnormal hypersecretions from hyperplastic epithelium

* Investigations :

[The Aim is to Exclude cancer].

- U/S & Soft Tissue Mammography
- Aspiration + Cytology.
- Biopsy + Histopathology.

* Treatment :

(A) Medical ttt (The Main)

- Reassurance of the patient
- Advice patient To stop caffeine & taken (NSAID) as analgesic
- Sedatives & Tranquilizers.
- Support the Breast by Strapping or Tight brassier to decrease pain
- Parlodel (Anti-prolactin) : 2.5 mg twice per/day.
- Danazol (synthetic androgen) : 100 mg twice per/day.
- Tamoxifen (Anti-aestrogen) : 10 mg once daily.

(B) Surgical ttt

Indicated with localized mass. So do → [Excision + Biopsy].

(C) Follow up with Atypical Hyperplasia: (Monthly Self examination).

V

Breast Neoplasm

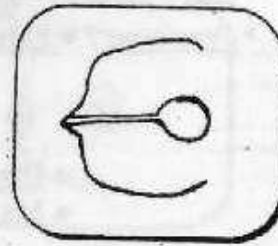
- Ⓐ Benign : • Epithelial : Duct Papilloma.
• Mixed : (Epithelial and Fibrous Tissue) Fibroadenoma.

- Ⓑ Malignant : • Epithelial : Carcinoma.
• Mesenchymal : Sarcoma



Benign Neoplasm

III Duct papilloma



* **Incidence** : Common at 30 – 40 years.

* **Aetiology** :

[Benign Tumor of Epithelial Cells] it may be

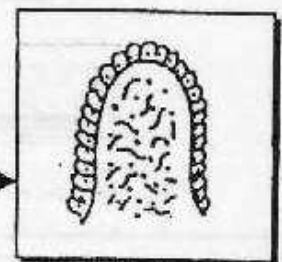
• From the start i.e. De Novo.

Or • On top of Excessive localisation of Epitheliosis of fibroadenosis.

* **Pathology** :

▪ N/E Picture : Usually single and Arises from the main lactiferous duct near nipple

▪ Microscopic picture : Core of very vascular C.T covered by hyperplastic epithelial layer.



* **Clinical Picture** :

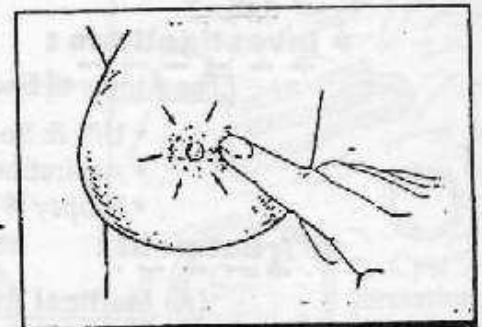
▪ Age : 30 – 40 years.

▪ Symptoms : • Bleeding per nipple

• Retroareolar mass
i.e Retention cyst

▪ Signs : • Retroareolar mass V. important for D.D from Fibroadenosis

• Localize the duct by palpation of each quadrant



* **Complications** :

▪ Malignant Transformation i.e. Duct Carcinoma.

▪ Profuse bleeding per nipple.

* **Investigations** :

Ductography : 
Retroareolar filling defect in major duct.

* **Treatment** : Microdochectomy

Excision of the affected duct through circum-areolar incision

- if there is a lump, the excision is easy.
- if there is no lump, the duct is identified by inserting a blunt Needle through the discharging nipple. finally the specimen should be histologically examined

III Papillary cystadenoma

- It is a rare lesion (precancerous).
- In spite of cystic but firm in consistency because it contains multiple papillomatosis.
- May give bleeding per nipple.
- Treatment is local excision.



IIII) Fibroadenoma



* **Incidence** : Commonest breast mass of young female.

* **Aetiology** :

[Benign Tumor of Epithelial cells + Fibrous tissue] It may be

• From the start i.e. De Novo.

Or • On top of Excessive localiaization of Adenosis & Fibrosis of Fibroadenosis.

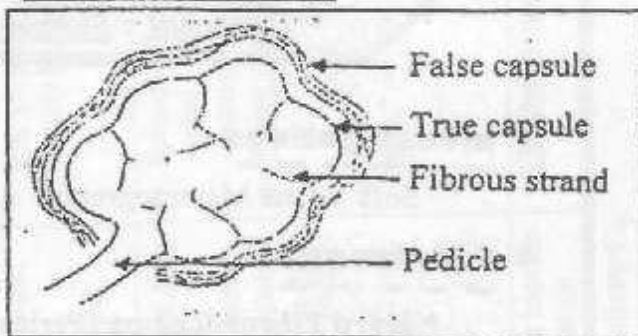
* **Pathology** :

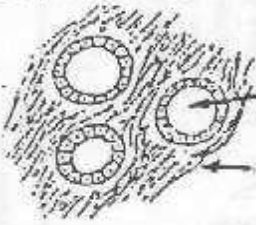
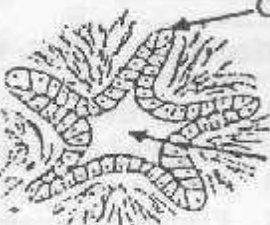
▪ The Tumor is (Well Capsulated) →

• True capsule: Showing fibrous band dividing it into lobules

• False capsule: Formed of compressed breast tissues.

▪ There are 2 Types



	Hard Fibroadenoma (Peri-canallicular)	Soft Fibroadenoma (Intra-canallicular)
▪ <u>N/E Picture</u>	• Attached to it's capsule by <u>one</u> pedicle. 	• Attached to it's capsule by <u>multiple</u> pedicles. 
▪ <u>Microscopic Picture</u>	Ducts surrounded by <u>Dense F.T.</u>  Rounded Glands Dense <u>F.T.</u>	Ducts are compressed by <u>F.T.</u>  Compressed Glands Slit like lumen

* **Clinical Picture** :

▪ <u>Age</u> ▪ <u>C/O</u> ▪ <u>Exam.</u>	20 - 30 years • <u>Hard</u> & Painless mass. • <u>Slow Rate</u> of growth i.e. malignancy is <u>Rare</u> .	30 - 40 years • <u>Soft</u> and Painless mass. • <u>Rapid Rate</u> of growth i.e. malignancy is <u>Common</u>
	• <u>Hard</u> & not tender. • Well defined edge. • Mobile (<u>Breast Mouse</u>) • <u>No</u> L.Ns Enlargement	• <u>Soft</u> & not tender.

* **Complications** :

▪ <u>Malignancy</u>	• Never	• Commonly → Sarcoma
---------------------	---------	----------------------

N.B. : Cystasarcoma Phylloides :

(Sero cystic disease of Brodie)

- **Path.** : It is Highly cellular type of fibroadenoma that tends to grows rapidly & > 40 years
- **Exam.** :
 - ♦ It is Giant Soft Fibroadenoma.
 - ♦ Ulcerate through skin but not attached to it
 - ♦ No Axillary L.Ns Except if infected.
- **Treatment** : Simple Mastectomy



(Cystasarcoma Phylloides)

*** Investigations :**

Soft Tissue Mammography

*** Treatment :**

- Hard Fibroadenoma (Pericanalicular) : Excision & Biopsy.
- Soft Fibroadenoma (Intracanalicular) :
 - *If small* : Excision & Biopsy
 - *If large* : Simple Mastectomy

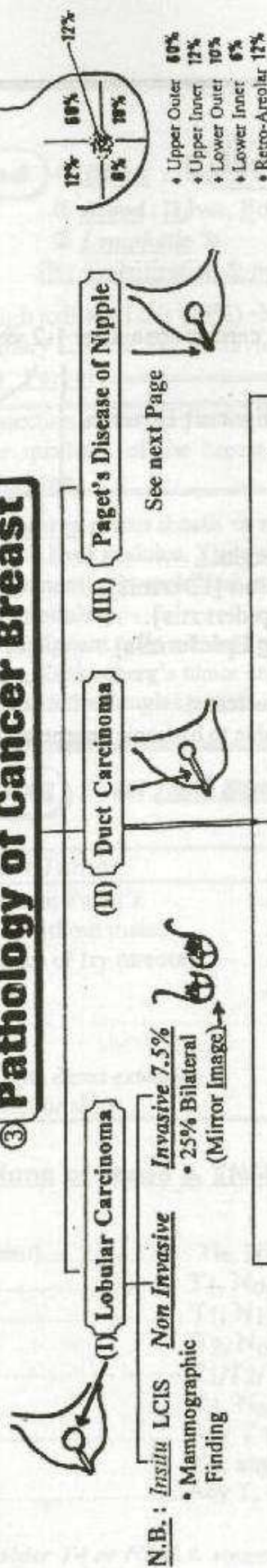
**Carcinoma of the Breast**① **Incidence** **35%** of Total malignancies of Egyptian Females.② **Aetiology** [Risk Factors]

1. Early menarche < (12 – 15) years.
2. Delayed menopause > 50 years.
3. Female get 1st pregnant > 30 years.
4. Female with cancer to near relatives.
5. Female with cancer to one breast.
6. Female with history of benign lesion.
7. Relations to prolonged use of oral contraceptive pills.
8. Relations to Atypical Hyperplasia of fibroadenosis, duct papilloma or papillary cystadenoma.
9. Relation to cancers as Cancer Colon & Endometrium.
10. Female Unmarried.
11. Female married but Nullipara.
12. Female married, multipara but Non lactating.
13. Exposure to Irradiation.
14. Carcinogenic drugs as Reserpin (↑ prolactine level).
15. Race : ↓ in Japanese & Chinese.
 ↑ in USA & Europe.
16. Dietary oil & fat.
17. Obesity as adipose tissue converts steroid hormones to oestrogen.
18. Bittner Milk Factor → In (Mice) only
Bittner says that there's onchogenic virus transmitted through milk from mother to her babies.



Cancer

③ Pathology of Cancer Breast



	① Sclerosing Ca. 70%	② Atrophic Sclerosing	③ Inflammatory V. rare
• <u>N/E picture</u>	- Small Hard irregular mass. - C.S. → - Gritty, Concave, Pale & Non capsulated	- The growth V. slow. - The spread V. late.	- Soft, gelly like material - Usually Bulky
• <u>Microscopic Picture</u>	- Fibrous tissue more than malignant cells - Area of Hge & Necrosis.	- Fibrous tissues are the main constituent - Minimal malignant cells	- Spheroidal cells, distended with mucoid material. - Signet ring like.
• <u>Prognosis</u>	Good if early diagnosed	V. Good Because of slow growth & Late spread	- The Best prognosis. - The Worst prognosis.

N.B: Also called Medullary Ca.

(III) **Paget's Disease of the Nipple***** Incidence :**

1% with female > 40 years.

*** Definition :**

Malignant Erosion of nipple & areola followed by carcinoma after 1-2 years.

*** Aetiology :**

Intraductal carcinoma → Spread → Nipple → Malignant Eczema.

*** Pathology :**

▪ N/E Picture : [Malignant Eczema]

Unilateral with well defined margin.

▪ Microscopic picture : ① Round cell infiltration [Dermis].

② Hyperplasia [All Epidermis].

③ Paget's Cells [Deep Epidermis]

- Large.
- Dark multinucleated.
- Vacuolated due to hydropic degeneration

*** Clinical Picture :**

2 Types may be present

- ① Ulcerative Type.
- ② Eczematous Type.

*** D.D. :**

<u>Paget's Disease</u> (Malignant Eczema)	<u>Dermatitis</u> (Ordinary Eczema)
• <u>Old</u> Female. • <u>Unilateral</u>. • <u>Erosion</u>. • <u>No</u> (Itching and Oozing). • <u>Associated with</u> carcinoma. • <u>Not</u> respond to Eczematous ttt.	• <u>Young</u> female. • <u>Bilateral</u>. • <u>No</u> Erosion. • <u>Itching & Oozing</u>. • <u>Associated with</u> Breast abscess. • <u>Respond</u> to Eczematous ttt.

*** Staging :**

Paget's disease alone = (Stage I)

*** Treatment :**

Radical Mastectomy (considered stage I)

N.B. : Paget's disease Radioresistant.

*** Prognosis :**

Paget's disease alone = Good prognosis

III) Manchester Classifications

	Tumor	Axillary L.Ns	Metastasis
Stage I	♦ <u>Mobile</u> breast mass.	♦ NO	♦ <u>NO</u>
Stage II	♦ <u>Mobile</u> breast mass.	♦ <u>Mobile</u> (At same side).	♦ <u>NO</u>
Stage III	♦ <u>Skin</u> involvement. ♦ <u>Pectoralis</u> muscles involved. ♦ <u>No</u> Chest wall involvement.	♦ <u>Fixed</u> (At same side). ♦ <u>±</u> Supraclavicular L.Ns	♦ <u>NO</u>
Stage IV	♦ <u>Skin</u> involved e.g. Cancer en cuirasse ♦ <u>Pectoralis</u> muscles involved. ♦ <u>Chest wall</u> involved	♦ Involved at <u>opposite</u> side of Axilla.	♦ <u>Metastasis</u> <u>Mainly</u> Bone

N.B. : Stage I & II are operable.
But Stage III & IV are Inoperable.

⑥ Clinical Picture

▪ Age : Commonly at 40 – 60 years + Risk factors.

▪ Symptoms : [A] General symptoms :

(May be the 1st presentation) i.e. Occult carcinoma.

- Lung : Chest pain, Cough, Dyspnea & Haemoptsis.
- Bone : Mass in skull, Backache & Pathological fracture.
- Liver : Pain at Rt. hypochondrium & Jaundice.
- Brain : Extremely rare.

[B] Local symptoms :

- Hard, Painless mass, Discovered accidentally.
- Rapid Rate of growth.
- Discharge : ① Blood If Duct Carcinoma.
② Necrotic crystals If Degenerating Carcinoma

▪ Signs : [A] General signs :

- ♦ To detect Metastasis (Liver, bone, PR, PV & ... etc).

[B] Local signs :

- (1) Mass : ▪ Hard not tender mass.
▪ Circumscribed edge (Hard mass inside Soft breast).
▪ Flat under surface (local spread Ant. > Post.).
▪ Fixed to skin & ± Chest wall.

(2) L.Ns : [Hard, Enlarged, 1st mobile then fixed]

(3) Breast : Skin Manifestations

① Dimpling & Puckering :

- ♦ Due to Contracture of Cooper's ligament.

- ② Nipple Retraction & Deviation :
 - Due to Excessive fibrosis [Not pathognomonic].
- ③ Peau d'orange : [Pitting oedema]
 - Due to Obliteration & Compression of lymphatics by excessive fibrosis [Not pathognomonic].
- ④ Cancerous Skin Nodules :
 - Due to lymphatic spread. It may be near or far from tumor e.g. Around umbilicus.
- ⑤ Cancer en cuirasse : [Advanced stage]
 - It means Hard, Thick Skin, Metallic brown & Stretched as [War-Shield].
- ⑥ Ulceration & Fungation :
 - Raised everted edge with necrotic floor.
- ⑦ Paget's Disease of Nipple See before
- ⑧ Mastitis carcinomatosa : See before
- ⑨ Dilated veins over the skin of the breast.

⑦ Differential Diagnosis

[A] DD from Nipple Retraction :

- Carcinoma.
- Duct Ectasia. (Characterized by) ⇄
[History of Green paste discharge].
- Chronic Breast Abscess (Characterized by) ⇄
[History of Acute Abscess or A.B intake].

[B] DD from Bloody Discharge :

- Duct carcinoma
- Duct papilloma (Characterized by) ⇄
[The mass is Retroareolar].

[C] DD from Hard Mass :

- Carcinoma.
- Duct Ectasia.
- Chronic Breast Abscess.
- Traumatic (Characterized by) ⇄
[History of Trauma].
- Hard Fibroadenoma (Characterized by) ⇄
[Mobile i.e. Breast Mouse + No Axillary L.Ns].

⑧ Investigation



[A] Soft tissue mammography :

- ♦ Cancer appears as A dense opacity.

N.B. : Mammography is of less value with young female
Because of similarity of lesion to the dense breast.

♦ **Technique :**

- ① Ordinary plain x-ray for breast.
- ② Xeroradiography : (more clear & easy to read) the image is recorded on selenium plate.

♦ **Indications :**

- ① Screening for high risk group.
- ② Search for occult cancer in female with metastatic disease.
- ③ Evaluate non palpable breast lump.
- ④ Evaluate opposite breast with cancer another breast.

♦ **Mammographic finding suggestive of malignancy.:**

- ① Microcalcification (*Stippling sign*)
- ② Irregular outlines from irregular spicules penetrate surrounding breast.
- ③ Increase vascularity of the breast.
- ④ Nipple retraction.



[B] Ultrasonography :

- ♦ It can differentiate solid from cystic mass.
- ♦ It is useful in young women whom mammography not helpful

[C] Diagnostic procedures (Biopsy) :

- ♦ Excision biopsy : (the most reliable) but under general anaesthesia.
- ♦ Frozen section biopsy : Diagnosed within 20min while patient under anaesthesia (if +ve → radical mastectomy).
- ♦ Tru-cut biopsy : Under local anaesthesia by a special needle cuts a core of tumor tissue. It's disadvantages are :
 - ① Take a false tissue.
 - ② May disseminate malignancy.
- ♦ Fine needle aspiration cytology (FNAC) :
 - ① Advantages : 90% accurate, very simple & inexpensive.
 - ② Disadvantages : A skilled cytologist is needed.



[D] MRI of the breast :

- ♦ It can detect recurrent mass & Gold standard of women with synthetic implant.

[E] Thermography :

- ♦ The skin over the tumor is warmer than surrounding due to high vascularity so we can record it by infra-red camera but it is not sensitive as not all tumors .

[F] Detection of distant metastasis :

- ♦ Lung → plain x-ray.
- ♦ Brain → CT scan & MRI.
- ♦ Liver → U/S & liver function test.
- ♦ Bone → bone scan.

[G] Detection of tumor markers :

- ♦ CA 15-3 : Cancer Antigen. (Prognostic rather than diagnostic)

* Early detection :

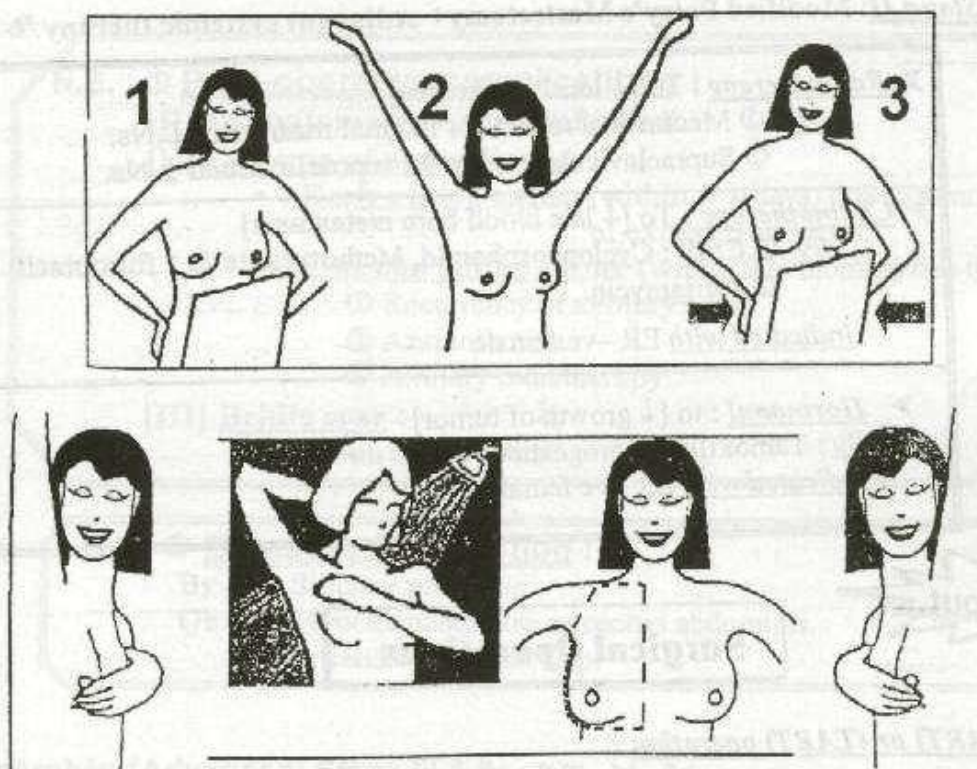
- This aims at the detection of breast cancer very early in the asymptomatic females.
- There are two main methods for early detection of breast cancer:

[1] Breast self examination (BSE)

- All woman over age 20 should be advised to examine their breasts monthly.
- The physician instructs the women as how to conduct a systematic inspection and palpation.
- The woman suspects the presences of a lump, skin dimpling, or nipple retraction .

[2] Screening programs:

In some Western countries high risk women are subjected to regular clinical examination and mammography. The frequency of examination is every one, two, or three years, depending on the program



	Early breast cancer	Advanced breast cancer
* Definition	T2 N1 M0 or less Or Manchester stage I or II	- More than T2 N1 Mo Or Manchester stage III or IV
* Synonyms	- potentially curable breast cancer	- Incurable breast cancer
* Aim	- Cure	- Palliation
* Disease status	- local disease + micro metastases	- systemic disease *
* primary treatment	- Surgery + Radiotherapy i.e., local treatment	- Chemotherapy and Endocrine therapy i.e., systemic treatment
* Adjuvant treatment	- Anti-oestrogen - Chemotherapy if axillary nodes show malignant deposits	- Surgery and chemotherapy have limited role for local control of disease

⑨ Treatment

[A] Operable (Early) Stage I & II : $\leq T_2, N_1, Mo$

Different surgical options + Adjuvant systemic therapy if +ve Axillary L.Ns

☆ Stage I : Modified Patey's Mastectomy + Follow up ➤

➤ Follow up :

- Aim to detect : ① Local Recurrence or Metastasis.
② Any post-operative complications.
- Time → After ttt Then Every 3 month at 1st 2 years
Then Every 4 months/Next 3 years Then yearly

☆ Stage II: Modified Patey's Mastectomy+ Adjuvant systemic therapy ➤

➤ Radiotherapy : To [↓ local recurrence]

- To : ① Mediastinal region for internal mammary L.Ns.
② Supraclavicular region for supraclavicular L.Ns.

➤ Chemotherapy : To [↓ late blood born metastasis]

- By : ① CMF : Cyclophosphamid, Methotrexate & 5 fluorouracil
② Adriamycin.

Indicated with ER -ve female

➤ Hormonal : to [↓ growth of tumor]

- By : Tamoxifen or progestine
Indicated with ER +ve female.

Idea About

Surgical Operations

1 [QUART] or [TART] operation :

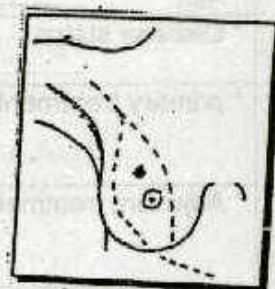
- [A] [QUART] Quadrectomy + Axillary L.Ns. removal + Radiotherapy.
[B] [TART] Tumorectomy + Axillary L.Ns. removal + Radiotherapy

N.B. Irradiation to Mediastinum & Supraclavicular regions

- It is suitable for : ① Small masses < 4 cm
② Big Breast
③ Well Differentiated tumour
④ Young Female

2 Radical Mastectomy of (Halsted) :

- Removal of ① Elliptical part of skin with nipple & Areola
② Whole Breast Tumor
③ 2 Pectoralis muscles.
④ All Axillary L.Ns & fat Medial to Axillary vein



▪ Preservation of

- ① Axillary vessels
- ② Cephalic vein

- ③ N. to Serratus Anterior
- ④ N. to Latissimus Dorsi.

3 Modified Radical Mastectomy of (Patey) (Most Widely Accepted)

- ⊙ The operation differs from Halsted radical mastectomy in preserving the pectoralis major muscle. The pectoralis minor is either removed or its insertion cut.

4 Extended Radical Mastectomy (Not done Nowadays).

- ⊙ Radical Mastectomy + Removal of Internal Mammary L.Ns., through sternotomy.

5 MC-Whirter Technique :

- ⊙ Simple mastectomy + post-operative radiotherapy for axillary L.Ns, supraclavicular L.Ns & Internal mammary L.Ns.

N.B. : ① Post-operative complications :**[I] Haematoma or wound infection.****[II] Oedema of upper limb :**

- Early pitting oedema (within few days) due to removal of excess lymphatics.
- Late non pitting oedema (within few months) due to :
 - ① Recurrence of axillary L.Ns.
 - ② Arm infection.
 - ③ Axillary radiotherapy.

[III] Bridle scar :

Limitation of abduction.

N.B. ② Breast reconstruction :

By : ① Silicone prothesis.

Or ② Myocutaneous flap as rectus abdominis or latissimus dorsi flap.

[B] Inoperable (Advanced) Stage III & IV : > T₂, N₁, Mo☆ Stage III : [1] Local ttt (The Main)

- Radiotherapy : To ① Mediastinum
- ② Supraclavicular region
- ③ Axilla

• Surgical Indication [for Fungating mass]

Through Palliative Simple Mastectomy (Toilet Mastectomy)

[2] Systemic ttt :

- Chemotherapy through (CMF & Adriamycin)
 - (6 cycles) for (6 months)
 - Indicated especially : ① Rapidly progressive disease.
 - ② Failure of hormonal treatment.

♦ Endocrinal ttt :

- 60% cancer breast have receptors for oestrogen so termed (ER +ve) which become :
 - More active in presence of this Hormone
 - Less active in absence of this Hormone
- Temporary response for anti-oestrogen after 24 - 30 months occur especially with Post-menopausal female or ER +ve.

♦ Endocrinal ttt as :

- Tamoxifen (Nolvadex) : 1st line of ttt.
- Progestins : 2nd line of ttt if relapsed after Tamoxifen
- Ovariectomy : as an alternative to get rid of oestrogen source in premenopausal female.
- Aminoglutathemide : drug producing suppression. For adrenal cortex i.e. ↓ oestrogen (if the patient develops relapse after ovariectomy).

N.B. : Hydrocortisone must be given with Aminoglutathemide.

☆ Stage IV : [1] Local ttt

- ♦ Radiotherapy for painful bony deposits
- ♦ Surgical through
 - Excision of skin nodules.
 - Internal fixation for pathological fracture.

[2] Systemic ttt (The Main)

- ♦ Chemotherapy through ① CMF.
② Adriamycin.
- ♦ Endocrinal ttt (As above)

[3] ttt of metastasis :

- ♦ Liver metastasis : Chemotherapy.
- ♦ Brain metastasis : Radiotherapy + Corticosteroids (↓ Intracranial tension)
- ♦ Lung metastasis : (Pleural effusion) Chest tube + Cytotoxic Bleomycine through it. i.e. Pleurodesis.
- ♦ Bone metastasis : Radiotherapy + Internal fixation.

N.B. ① New concept :

Cancer Breast is a systemic disease from the start at it spread
So Early by blood micro-metastasis.
So **Immuno-therapy** is (under trial)

N.B. ② DD of Associateds Axillary Mass :[1] From contents :

Enlarged L.Ns (The commonest). Enlarged tail of breast, Axillary artery aneurysm, Axillary vein thrombosis, Nerve tumor or Cystic hygroma.

[2] From skin and S.C. tissue : Lipoma or sebaceous cyst ... etc .

N.B. : Management of cancer breast during pregnancy :

- During 1st & 2nd Trimester : Radical Mastectomy + Termination of pregnancy.
- During 3rd Trimester : Radical Mastectomy + let the pregnancy proceed to full term then radiotherapy is postponed after delivery.

⑩ Prognosis Depending on ↗

- ① Type of Tumor : Paget's & Cancer situ **Better** than Mastitis carcinomatosa
- ② Stages of Tumor : Stage I **Better** than Stage II, III or IV.
- ③ Sites of Tumor : lateral side **Better** than Medial side
- ④ Age of Patient : Old age **Better** than Young [Because of sex Hormones]
- ⑤ Sex of Patient : Cancer female **Better** than Cancer male.
- ⑥ Hormone Receptors : ER +ve **Better** than ER -ve.

Sarcoma of the Breast

- Incidence : 0.5% of malignant breast tumors.
- Pathology : De Novo
- C/P : It grows rapidly & usually fungate through skin.
- Treatment : Simple mastectomy + Radiotherapy & chemotherapy.
- Prognosis : Very Bad.

*** Aetiology :****VI Breast Cyst****(A) Stroma Inter-acinar cysts**

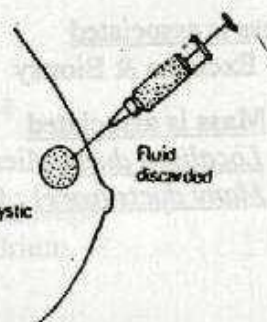
- Traumatic : Blood Cyst
- Inflammatory : Cold abscess (T.B) or Acute Abscess
- Neoplastic : Degeneration Carcinoma.
- Parasitic : Hydatid Cyst
- Miscellaneous : Skin Cyst
e.g. Sebaceous cyst, Lymphatic cyst etc...

(B) Duct Lacinar cysts

- Fibrocystic Disease : e.g. Cyst of blood-good
- Retention Cyst : e.g. Duct Papilloma
- Galactocoele : (Milk. Cyst)
 - Retention cyst blocked by (Inspissated Milk)
 - Sometimes shows **Milky discharge**
 - Affect lactating female.
 - Resolute spontaneously.

*** Treatment :****(A) Aspiration + Cytology**

- (B) Excision If**
- ① Rapid Refilling after aspiration
 - ② Residual Mass after aspiration
 - ③ Bloody aspirate



VII Nipple Discharge (مهم جدا)

* Aetiology :

☆ Physiological :

- ① Milky discharge : during lactation
- ② Serous discharge : during pregnancy

☆ Pathological :

- ① Purulent discharge : Acute breast Abscess
- ② Green paste discharge: Duct Ectasia
- ③ Serous, green, brown : Fibroadenosis
- ④ Bloody discharge : - Duct papilloma
- Duct carcinoma
- ⑤ Necrotic Crystals : Degeneration carcinoma
- ⑥ Milky discharge : - Galactoceles
- Contraceptive pills
- Hyper-prolactinaemia



* Diagnosis :

☆ History

☆ General Examination

☆ Local Examination

- Specially for
 - ① Nature & Side of discharge.
 - ② Associated mass
 - ③ Age of patient
 - ④ Uses of contraceptive pills
 - ⑤ Uses of drugs as prolactine

* Investigations :

☆ Soft Tissue Mammography

☆ Ductography :

- Lipidol injection shows filling defect if mass present

☆ Biopsy & Cytology for mass

☆ Serum prolactin level

☆ Tests for occult blood in discharge [Benzidine test]

* Treatment :

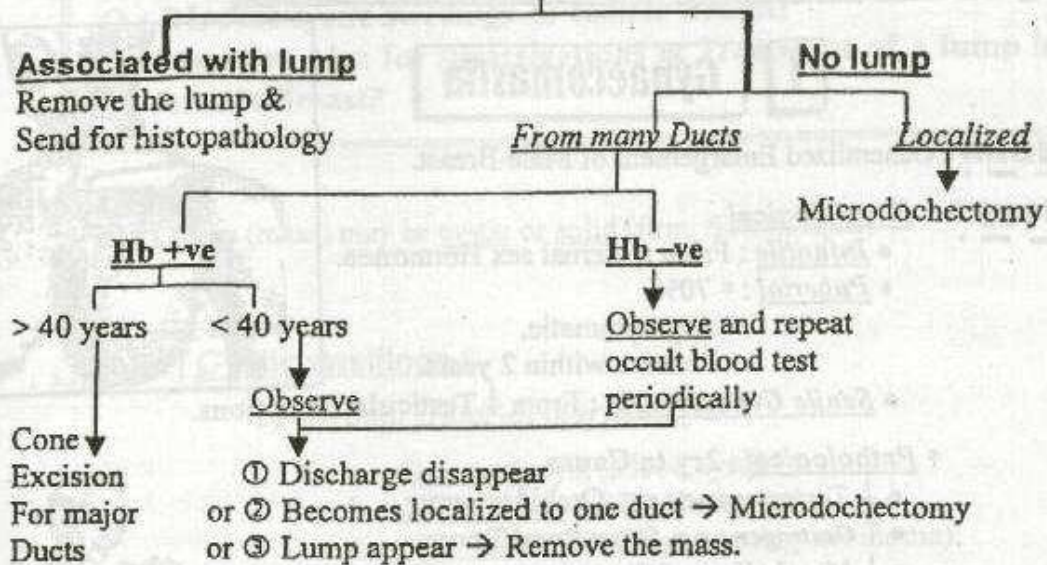
☆ If Mass is associated

- Excision & Biopsy

☆ If No Mass is associated

- Localized ducts Microdochectomy
- Many ducts (rare) : Cone excision of major ducts.

N.B: Scadule For Treatment of Nipple discharge



DD of Chronic Breast Masses (مهم جدا)

(1) Cystic swellings: (See before)

(2) Solid Swillings:

[A] Hard masses :

- ① Traumatic disease.
- ② Chronic Breast Abscess.
- ③ Mammary Duct Ectazia.
- ④ Hard fibroadenoma.
- ⑤ Cancer Breast (Scirrhou & Atrophic scirrhou)

[B] Soft masses :

- ① Soft fibroadenoma.
- ② Cancer breast (Encephaloid & Mucinous).

[C] Firm mass :

Fibroadenosis.



N.B. Causes of Huge Breast

- ① Virginal Hypertrophy.
- ② Soft fibroadenoma.
- ③ Cystasarcoma phylloids.
- ④ Sarcoma.

DD of Pain in The Breast

(I) From the breast :

- ① Fibroadenosis.
- ② Milk engorgement, bacterial mastitis, acute abscess & plasma cell mastitis.
- ③ Carcinoma not painful except (advanced, infected or mastitis carcinomatosa).

(II) Outside the breast :

- ① Angina pectoris.
- ② Pleurisy.
- ③ Myositis.
- ④ Intercostal neurologia.
- ⑤ Osteitis of rib.

⑥ Tietze's disease (Rare) :

Idiopathic tender swelling in 2nd & 3rd costal cartilage.

Treated by Hydrocortisone into the perichondrium.



Diseases of Male Breast

I Gynaecomastia

* **Definition** : Generalized Enlargement of Male Breast.

* **Aetiology** : Physiological

- Infantile : From maternal sex Hormones.
- Pubertal : 70%.
 - Asymptomatic.
 - Resolve within 2 years.
- Senile Gynecomastia : From ↓ Testicular Functions.



▪ Pathological : 2ry to Cause

- ↓ Testosterone : e.g. Orchidectomy.
- ↑ Oestrogen : e.g. Supra Renal Tumor.
- ↓ Metabolism of Oestrogen : e.g. Liver Cell Failure.
- Ectopic Hormones : e.g. Bronchial Carcinoma.
- Drugs : e.g. Digitalis, cimitidin, Aldactone. Reserpine or Oestrogen therapy as cancer prostate.



* **Clinical Picture** :

- Symptoms : Bilateral, Tender mass (i.e. like a disc).
- Sign : Enlargement of the male breast with prominent nipple due to hypertrophy of the glandular tissues. .

* **Investigations** :

- Hormonal Profile.
- Liver Function test.
- Biopsy if doubt of cancer.

* **Treatment** :

- Medical (Mainly) : ① Physiological : Reassurance.
② Pathological : ttt of cause.
- Surgical Indication : If persist → S.C. Mastectomy.

II Carcinoma of Male Breast

* **Incidence** : Male : Female = 1 : 100
(1% of all cancer breast)

* **Staging** : As Cancer Female Breast

* **Treatment** :

* **Prognosis** : Cancer Female Better than Cancer Male.



ازاي تجاوب

Q : Discuss DD of Breast Lump?

Q : Discuss cystic swellings of female Breast?

Q : Mention plan for Investigations & Treatment of a lump in female Breast?

Answer :

Lump (mass) may be cystic or solid (firm, Soft & Hard)

So [A] Cystic swellings :**1) Stroma (Inter-acinar) cysts :**

- a. Traumatic cyst (Blood cyst).
- b. Inflammatory (T.B. Abscess).
- c. Neoplastic cysts (Degenerating carcinoma).
- d. Parasitic (Hydatid cyst).
- e. Others (sebaceous, lymphatic etc....).

2) Duct (Acinar) cysts :**a. Retention cyst [Duct papilloma]**

- Aetiology: Benign Tumor may be De Novo or on top of localized epitheliosis of Fibroadenosis.
- Pathology: Core of vascular C.T. covered by hyperplastic epithelium
- C/P: 30-40 years + bleeding per nipple with Retro-areolar mass.
- Complications: Duct carcinoma or Anaemia.
- Investigation: Ductography.
- Treatment: Microductectomy.

b. Fibrocystic diseases [Cyst of Blood good] (Fibroadenosis)

- Aetiology: Unknown may be relative hyperoestrogenaemia.
- Pathology: - N/E: Localized or diffuse, unilateral or bilateral 15% common at upper-outer quadrant of Breast.
- M/P: Adenosis, Epitheliosis, fibrosis & cyst formation which may be microcyst or macrocyst (cyst of Blood good).
- C/P: - Age: After puberty or before menopause.
- Symptoms: Pain related to menses with serous, green or dark brown discharge & cystic mass if cyst of blood good.
- Signs: Tender cystic swelling.
- Investigation: U/ S, Soft tissue mammography, Aspiration cytology or Biopsy histopathology.
- Treatment: Excision of a mass.

c. **Galactocoele**

It is a retention cyst blocked by inspissated milk, may be associated with milky discharge. Usually occur in lactating female. Treated by Aspiration cystology or Excision.

[B] Solid Swellings :(1) **Firm mass** : [Fibroadenosis]

(See above mentioned cyst of Blood good)

but it is firm mass felt by Tips of fingers.

Treated by Reassurance & Anti-oestrogen (Parlodel)

(2) **Soft masses** :(a) **Soft fibroadenoma**

- Aetiology : Benign Tumor may be De Novo or on top of Adenosis & Fibrosis of Fibro-adenosis.
- Pathology : Lobulated mass with multiple pedicle.
- C/P : - Age : 30-40 years.
- Symptoms: Soft, painless & rapidly growing Tumor.
- Signs : Soft, not tender, No L.Ns & if enlarged it is called (Cysto-sarcoma phylloides).
- Investigation : Soft tissue mammography.
- Treatment : Small (Excision biopsy) or large (simple mastectomy)

(b) **Encephaloid Ca. Breast** 10%

- It is large, soft, irregular & non capsulated mass.
- Cut section : Convex.
- Prognosis : The Best prognosis.

(c) **Mucinous Ca. Breast** 3%

- It is large, soft, irregular & non capsulated mass.
- Cut section : Gelly like & usually bulky.
- M/P : Rounded malignant cells filled with mucoid material give (signet ring) appearance.

(3) **Hard masses** :(a) **Traumatic disorders**

- Traumatic fat necrosis : Which caused by blow on breast → death (Necrosis) of fat cells → release of fatty acids which bind to Ca → Ca soap i.e. Hard. Treated by Excision.
- Breast Haematoma : Which caused by blunt trauma → blood clot & Fibrosis i.e. Hard. Treated by Excision.

(b) Chronic Breast Abscess

- Follow improper treatment of Acute Abscess by Antibiotics so it is called Antibioma. Treated by Excision & biopsy.

(c) Mammary Duct Ectasia

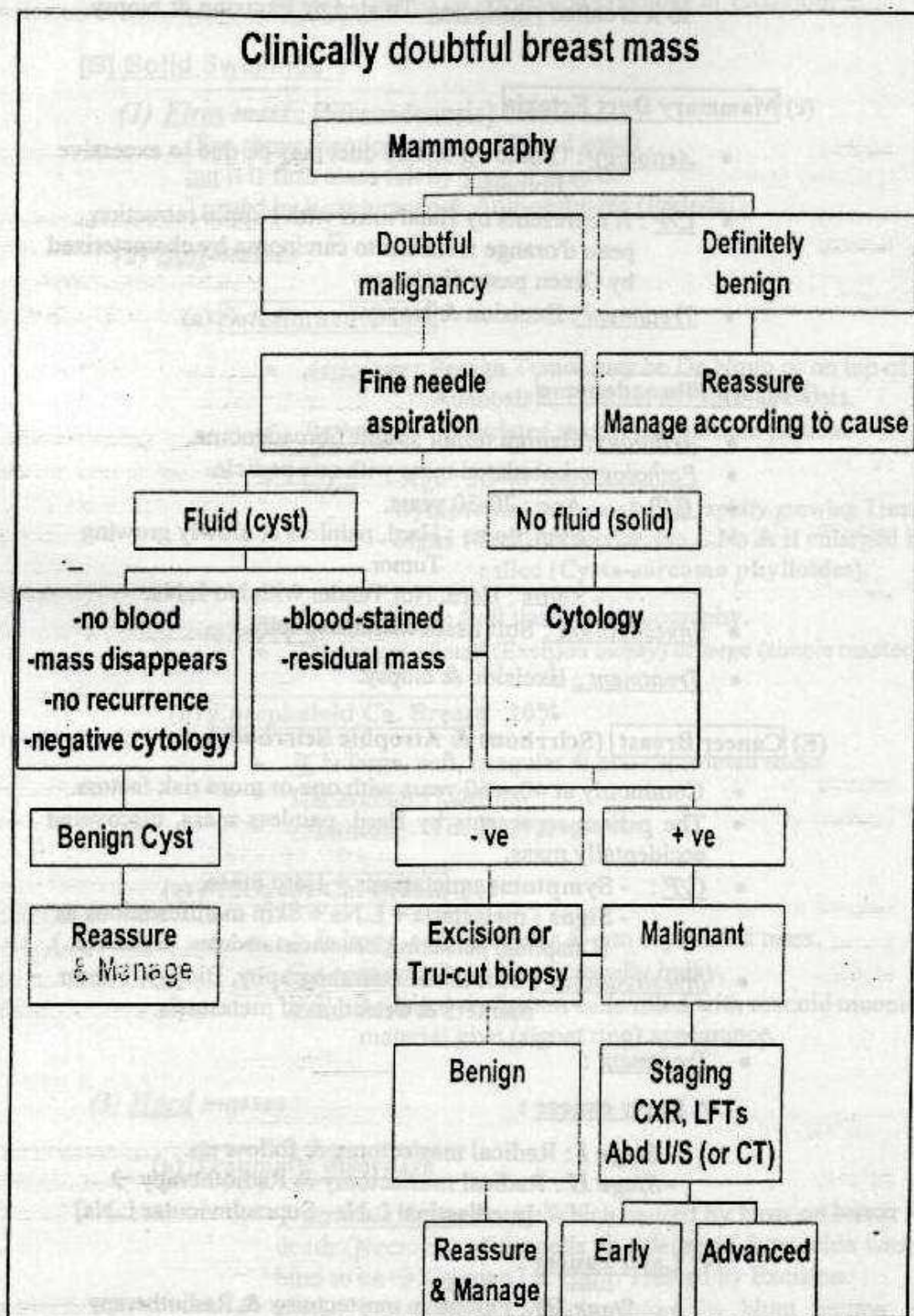
- Aetiology : Unknown dilated duct may be due to excessive fibrosis.
- C/P : It represents by Hard mass with Nipple retraction, peau d'orange it similar to carcinoma by characterized by Green paste discharge.
- Treatment : Excision & biopsy.

(D) Hard Fibroadenoma

- Aetiology: Benign tumor as soft fibroadenoma.
- Pathology: Lobulated mass with one pedicle.
- C/P : - Age : 20-30 years.
- Symptoms : Hard, painless & slowly growing Tumor.
- Signs : Hard, Not Tender with No L.Ns.
- Investigation : Soft tissue mammography.
- Treatment : Excision & biopsy.

(E) Cancer Breast (Scirrhou & Atrophic Scirrhou)

- Commonly at 40 – 60 years with one or more risk factors.
- The patient represents by Hard, painless mass, discovered accidentally mass.
- C/P : - Symptoms : metastasis + Hard mass.
- Signs : metastasis + L.Ns + Skin manifestations as (Dimpling, puckering, cancerous nodules, pagets etc..).
- Investigations : Soft tissue mammography, Biopsy, Tumor markers & detection of metastasis.
- Treatment :
 - ☛ Early cancer :
 - Stage I : Radical mastectomy & follow up.
 - Stage II : Radical mastectomy & Radiotherapy → [mediastinal L.Ns– Supraclavicular L.Ns]
 - ☛ Later cancer :
 - Stage III : Palliative mastectomy & Radiotherapy for mediastinal L.Ns, Supraclavicular L.Ns & Axillary L.Ns.
 - Stage IV : Mainly treatment of metastasis.





Final Written Exams



- 1993**
• Discuss Fibroadenosis of the Breast. (10 Marks)
- 1994**
• Anatomy of Lymphatic Drainage of Female Breast. (15 Marks)
- 1995**
• Discuss Path., C/P & ttt of Acute Breast abscess. (15 Marks) نور ثانی
• Discuss Skin Manifestations of Female Cancer Breast. (10 Marks)
- 1996**
• Discuss C/P & ttt of Acute Breast Abscess. (10 Marks)
- 1997**
• Discuss C/P of lactational mastitis & Breast Abscess. (10 Marks)
• Enumerate path. Types of Breast Carcinoma (5 Marks)
• Discuss 2 systems of staging of Cancer Breast (10 Marks)
- 1998**
• Discuss Path., C/P & ttt of Fibroadenoma of Breast. (15 Marks) نور ثانی
• Discuss management of Early cancer breast (15 Marks)
- 1999**
• Discuss aetiology, diagnosis & ttt of Nipple Discharge (10 Marks) نور ثانی
• Describe Lymphatic drainage of the breast. (10 Marks) نور ثانی
• Discuss DD of Breast lump. (25 Marks)
- 2000**
• Discuss C/P & treatment of Acute lactational mastitis & Breast Abscess (15 Marks) نور ثانی
• Discuss causes & diagnosis of Nipple discharge (10 Marks)
- 2001**
• Discuss Anatomy of lymphatic draining of breast (10 Marks) دور ثانی
• Discuss skin manifestations of cancer breast (10 Marks) دور ثانی
• Mention Aetiology, pathology, C/P of acute breast abscess (10 Marks)
- 2002**
• Mention DD of Breast lump (15 Marks) دور ثانی
• Discuss causes & management of Nipple discharge (12 Mark)
• Discuss DD between paget's & eczema (12 Mark)
- 2003**
• Enumerate causes & investigations of discharge pr nipple (12 Mark) نور ثانی
• Discuss Paget's disease of nipple. (12 Mark) نور ثانی
- 2004** • Discuss Anatomy of female Breast. (20 Marks) دور ثانی



Chapter [10]

Thyroid Diseases

The Thyroid Gland

Development of the Thyroid Gland

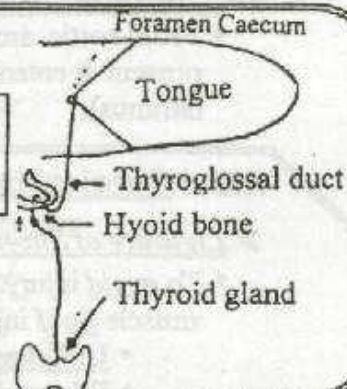
The Thyroid gland is developed as a Bud from the floor of the primitive pharynx i.e. Foramen caecum at 3rd week (Intra-uterine)

N.B. : Foramen Caecum :

It is the junction between Ant. 2/3 & Post. 1/3 of the Tongue

Then it descends being connected to the foramen caecum of the tongue by Thyroglossal duct which disappear later.

During its descend, it joined by para-follicular "C" cells which is derived from Neuronal crest.



Histology of the Thyroid Gland

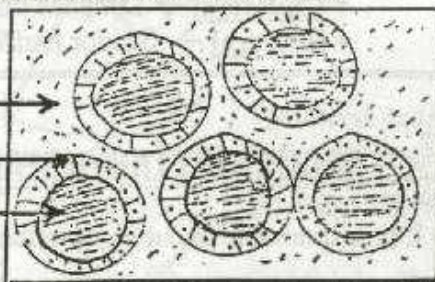
The Thyroid Gland formed of Acini

Which is

▪ Separated by : Connective Tissue.

▪ Lined by : Simple Cubical Epithelium.

▪ Filled with : Colloid Substance.



Surgical Anatomy of the Thyroid Gland

* **Parts :**

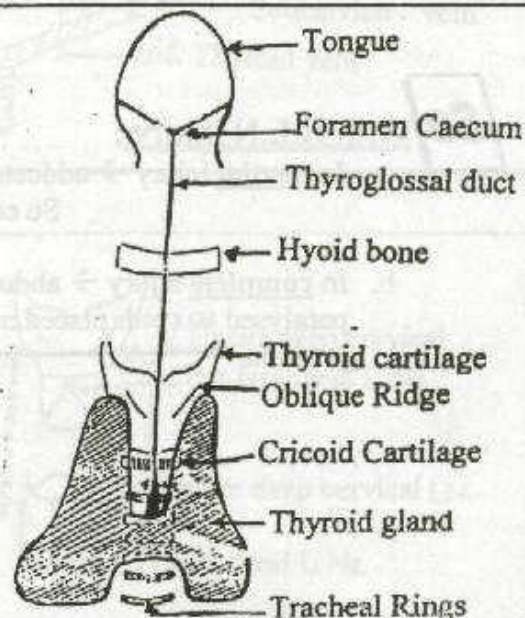
- 2 Lobes.
- Isthmus.
- Pyramidal lobe. 80% of people is attached to hyoid bone by (Levator Glandulae Thyroidae)

* **Weight :**

20-25 Gram

* **Level :**

- Upwards : Oblique line of the thyroid cartilage.
- Isthmus : Opposite 2nd, 3rd, 4th Tracheal rings.
- Base : At level of 5th Tracheal ring.



(A) * Arterial Supply : →**① Superior Thyroid Artery :**

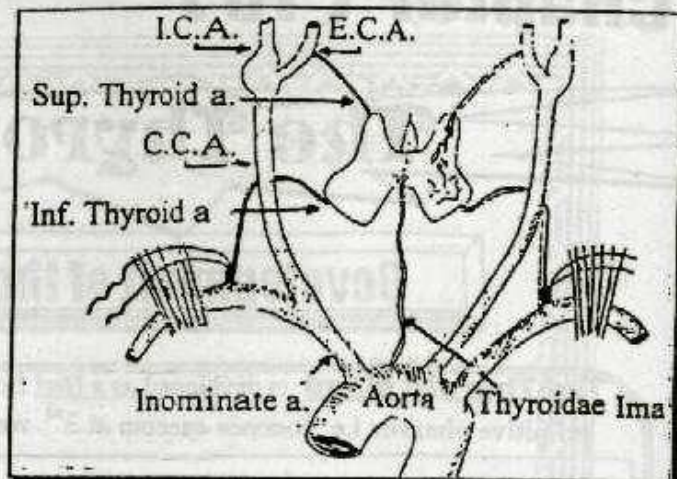
- From E.C.A & Related to External laryngeal nerve.

② Inferior Thyroid Artery :

- From Thyrocervical trunk of 1st part of subclavian artery & related to RLN.

③ Thyroidal Ima Artery :

- From aortic arch (occasionally present & enters lower part of the isthmus).

**N.B. : Surgical Importance :****> Ligature of Superior Thyroid Artery (near) the upper pole, Why?**

- To avoid injury of (External Laryngeal Nerve) which supply Cricothyroid muscle So If injury occur :

- Unilateral → Loss of high pitched voice.
- Bilateral → Choking.

> Ligature of Inferior Thyroid Artery (away from) the lower pole, Why?

- To avoid injury of RLN (Recurrent Laryngeal Nerve). So if injury occur :

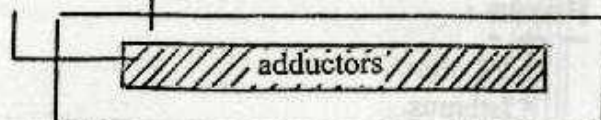
- Unilateral → Dyspnea on exertion or Hoarseness of voice.
- Bilateral → Stridor (suffocation) or Aphonia.

**N.B. : RECURRENT LARYNGEAL NERVE (R.L.N) :**

- It is responsible about co-aptation of vocal cord so produce Voice.
- For inspiration = complete abduction of cords is needed.
- R.L.N. has outer fibers for Abductor muscles and has Inner fibres for Adductor muscles.

**So With R.L.N Injury :**

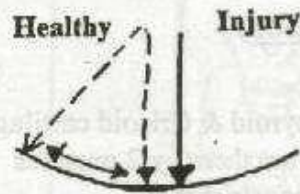
- In partial injury → adductors only are acting
So cords in mid line →
- In complete injury → abductors & adductors are paralysed so cords placed mid way = cadaveric position →



So The effect of injury of R.L.N as follows :

(A) Unilateral partial →

* *Dyspnea on exertion.*



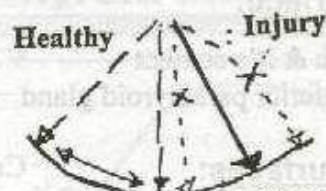
(B) Bilateral partial →

* *Stridor & suffocation.*



(C) Unilateral complete →

* *Hoarseness of voice.*



Unilateral cadaveric

(D) Bilateral complete →

* *Aphonia.*



Bilateral cadaveric.

(V) * Venous Drainage :

① Superior Thyroid Vein :

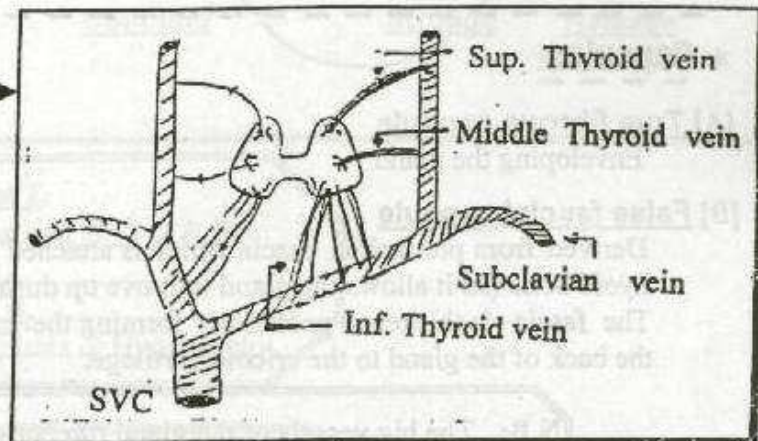
Drained to I.J.V

② Middle Thyroid Vein :

Drained to I.J.V

③ Inferior Thyroid Vein :

Drained to Innominate vein



(L) * Lymphatic Drainage :

▪ Upper Level :

• Lateral : Upper Deep Cervical L.Ns.

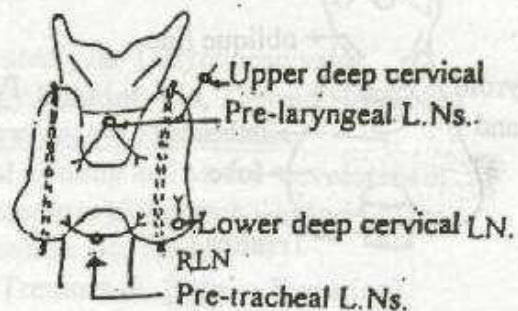
• Medial : Pre-laryngeal L.Ns.

▪ Lower Level :

• Lateral : Lower Deep Cervical L.Ns.

• Medial : Pre-tracheal L.Ns.
(Delphic L.Ns)

▪ Some lymphatics may pass to superior



* Relations of Thyroid Gland:

[A] Medial surface:

1. Upper part

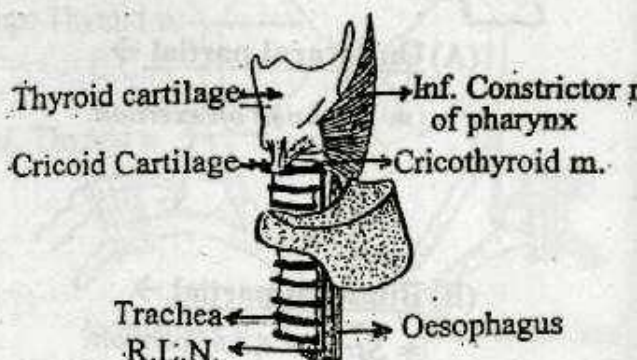
Larynx: (Thyroid & Cricoid cartilage)

Separated from them by 2 muscles

- a. Inferior constrictor m.
- b. Crico-thyroid m.

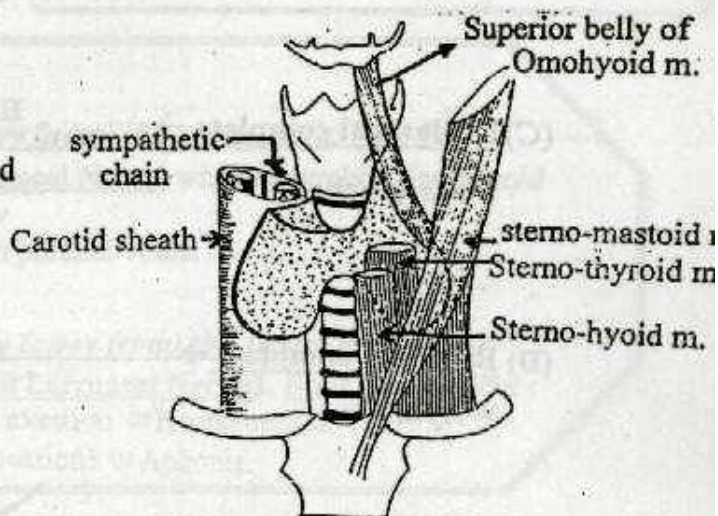
2. Lower part

Trachea & oesophagus
with (RLN) in between



[B] Posterior surface:

1. Carotid sheath & its content
2. Superior & Inferior parathyroid gland



[C] Superficial surfaces:

1. Superior belly of omohyoid
2. Sterno-hyoid
3. Sterno-thyroid
4. Thyro-hyoid
5. Anterior border of sternomastoid
6. Platysma
7. Skin

* Capsules:

[A] True fibrous capsule

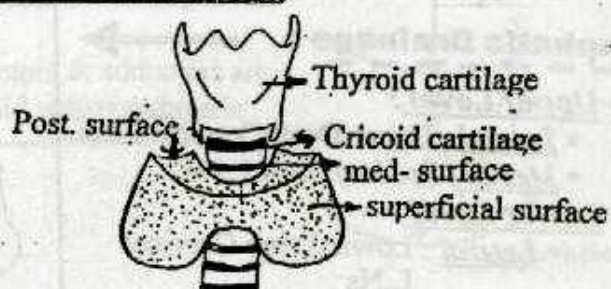
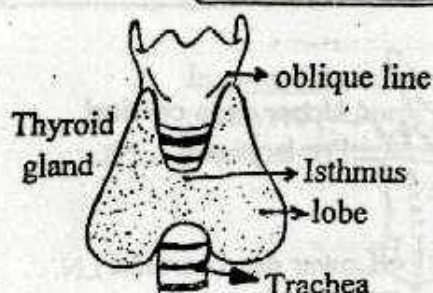
Enveloping the gland

[B] False fascial capsule

Derived from pretracheal fascia which is attached above to thyroid cartilage & hyoid bone (so it allows the gland to move up during deglutition).

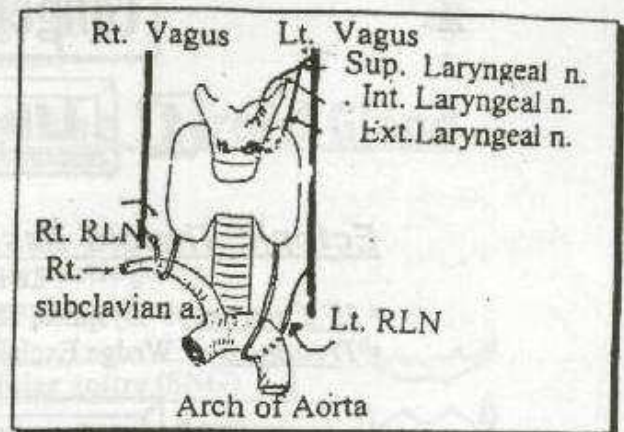
The fascia is thickened posteriorly forming the Ligament of Berry which fixes the back of the gland to the cricoid cartilage.

N.B: The big vessels of the gland run between the Previous 2 capsules.

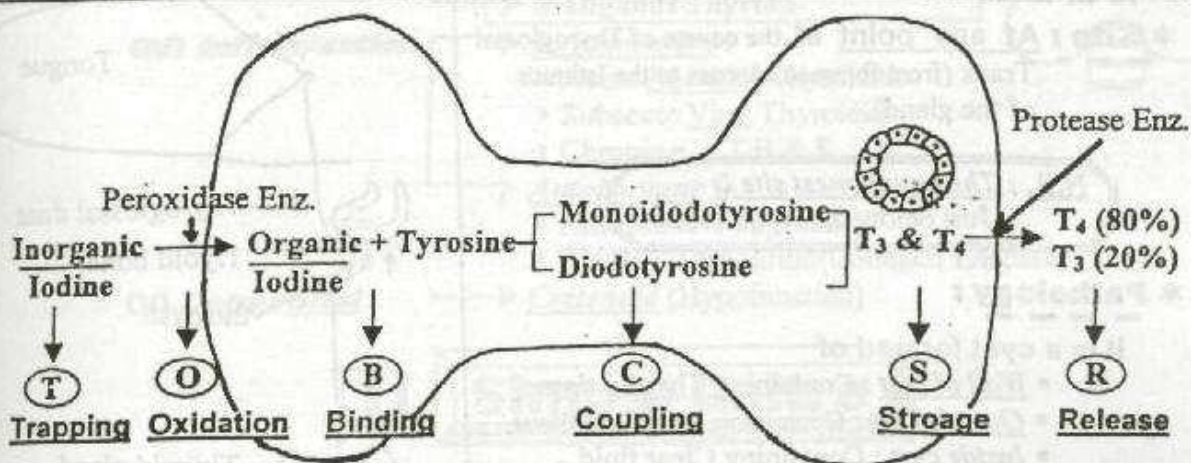


(N) * Nerves Related to the Gland :

- ① **External Laryngeal Nerve :**
 - From superior Laryngeal Nerve from Vagus Nerve.
- ② **Recurrent Laryngeal Nerve :** (From Vagus Nerve).
 - **Rt. RLN :** Hooks around Rt. subclavian artery.
 - **Lt. RLN :** Hooks around the arch of the aorta.



Physiology of the Thyroid Gland



- N.B.**
- ① Perchlorate → Prevent T.
 - ② Carbimazole & Thiouracil → ↓ O & B.
 - ③ Lugol's Iodine → ↓ R.
 - ④ TSH → +++ T, O & B.
- Excess TSH leads to Hyperplasia & Hypertrophy.

Physiological Functions of the Thyroid gland

- **The Gland secretes** 3 Types of Hormones [T₃, T₄ and Thyrocalcitonin]
- **The Effect of Thyroid Hormones :-**
 - **Catabolic effect:** (↑ Lipolysis - ↑ Proteolysis - ↑ Glycogenolysis).
 - **Metabolic effect :** (↑ MR & Energy liberation) So, Thyroid Hormones is called **Thermogenic Hormones**.
 - **Stimulate:** → Skeletal growth, Sexual maturity and Mental development.
 - **Increase sensitivity of:** (α & β Receptors) for catecholamine e.g. Adrenaline. So, leads to
 - (Heart → ↑ HR, Hand → Tremors & Skin → Sweating).
 - Decrease serum cholesterol level

Congenital Anomalies

I Lingual Thyroid

Ectopic Thyroid tissue occurs at base of tongue
i.e Behind foramen caecum

- **IF Enlarged** → Dyspnea, Dysphagia & Dysarthria.
- **Treatment** → Wedge Excision + L-Thyroxine for life.



II Thyroglossal Cyst

- * **Aetiology** : Remnant of Thyroglossal Duct.
- * **Site** : At any point of the course of Thyroglossal Track (from foramen caecum to the Isthmus of the gland).

N.B. : The commonest site is
Just below the Hyoid bone

* **Pathology** :

It is a cyst formed of

- Wall of cyst : Containing Thyroid tissue.
- Outside cyst : Containing Lymphoid tissue.
- Inside cyst : Containing Clear fluid.

* **Clinical Picture** :

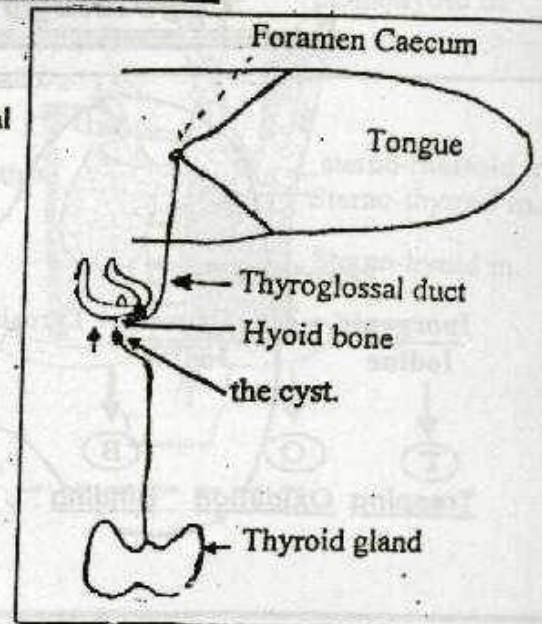
- **Age** : Common at Childhood.
- **Symptoms** : ① Mass at middle line of neck i.e. Disfigurement.
② Pain if infected.
③ Fistula if complicated.
- **Signs** : ① Rounded mass at middle line of neck.
② Tense & Cystic in consistency.
③ Moves up & down with deglutition & protrusion of tongue.

* **Complication** : **[Thyroglossal Fistula]**

- **Incidence** : Acquired Never congenital.
- **Aetiology** : Infection of cyst due to high lymphoid tissue outside the cyst.
- **Manifestations** : ① Discharge : Viscid fluid or Pus.
② Firm tract : From fistula (below) to hyoid bone (above).
③ The opening : Crescentic due to fibrosis, from infection.

* **Treatment** : **[Sistrunk Operation]**

- Elliptical Incision over cyst or fistula.
- Excision of cyst or fistula.
- Removal of ① The Track.
② The centre of Hyoid bone to prevent recurrence.
③ Core of tissue up to foramen caecum of tongue



[Thyroglossal Cyst]



thyroglossal fistula

* **DD** : Subhyoid bursitis

Goitre

[Goitre] = Enlargement of the Thyroid Gland

☆ Classifications

(I) Simple Goitre

→ Diffuse hyperplastic goitre.

- Physiological
- Colloidal

→ Simple Nodular goitre (SNG)

(II) Toxic Goitre

→ 1ry or 2ry Toxic goitre.

→ Toxic Nodule.

(III) Neoplasm

→ Benign Neoplasm.

→ Malignant Thyroid

(IV) Inflammation

→ Inflammatory :

- Acute Bacterial Thyroiditis.
- Subacute Viral Thyroiditis.
- Chronic e.g. T.B & S.

→ Autoimmune

- Hashimoto's Thyroiditis.
- Riedle's Thyroiditis (Collagen Disease)

(V) Congenital

→ Cretinoid (Hypofunction)



Simple Goitre

* Definition :

Non Toxic, Non Neoplastic & Non Inflammatory enlargement i.e. [patient is euthyroid]

* Aetiology :

[Simple Goitre results from ↑ TSH as sequence of ↓ Iodine]

① Iodine Deficiency : which may be

- Absolute : Endemic as Fayoum.
- Relative : As Pregnancy, Puberty etc..

② Enzyme Deficiency :

→ Congenital deficiency of Peroxidase Enzyme [Pendred's syndrome].

Which convert inorganic I_2 into organic I_2 .

C/P : Goitre + Dwarfism + Deafness & Mutism

→ Congenital deficiency of dehalogenase enzyme

Which convert Mono-iodo Tyrosine → Di-iodo Tyrosine

③ Goitrogenic Substance :

- Diet : Thiocyanates in Cabbage & Cauliflower.
- Drugs : Antithyroid drugs as Thiouracil & PASA.

* Types :

- (1) Simple Physiological (Diffuse Hyperplastic) Goitre .
- (2) Simple Colloid Goitre .
- (3) Simple Nodular Goitre.

[1] Simple physiological (diffuse Hyperplastic) Goitre

* **Incidence** : Common in young girls "Venus Neck"

* **Aetiology** : Stress i.e. "Relative I₂ Deficiency".

* **Pathogenesis** : "Hyperplasia"

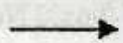
Stress → ↑ TRF from Hypothalamus → ↑ TSH from Ant. Pituitary →

▪ Diffuse Hyperplasia : i.e. ↑ Number of Acini.

▪ Hypertrophy : i.e. ↑ Cells lining the Acini.

So The Change

From Cubical



To Columnar



So Cut section shows Fleshy appearance

* **Clinical Picture** : Diffuse enlargement + 3 S [Smooth, Soft & Symmetrical]

* **Fate** : Return back to normal if stress is corrected or Passes into SNG.

* **Treatment** :

Reassurance + L. Thyroxine 0.2 mg/d. (several Months) then 0.1 mg/d (several Years).

[2] Simple colloid Goitre

[It is Intermediate stage between Physiological & Nodular goitre].

* **Incidence** : Common in Endemic area.

* **Aetiology** : Patient with (Diffuse Hyperplastic Goitre) receiving large doses of Iodine.

* **Pathogenesis** : "Hyperinvolution"

If the aetiology removed suddenly

As large dose of Iodine is taken .. This leads to Hyperinvolution.

So The Change

From Cubical



or Columnar



To Flat



So Cut section shows golden brown appearance. i.e Colloid

* **Clinical Picture** : Diffuse enlargement + 3 S [Smooth, Soft & Symmetrical]

* **Fate** : If untreated, it may pass into SNG.

* **Treatment** : Subtotal Thyroidectomy.

[3]

Simple Nodular Goitre

* **Incidence** : (The commonest disease of Thyroid gland)

- Age : Middle aged.
- Sex : Female > Male.

* **Aetiology** : See before

* **Types** :

It may be single or multinodular goitre.

* **Pathology** :

- Repeated cycles of hyperplasia & Involution
- The Nodules are Inactive.

* **Complications** :

(A) **In the gland itself**

① Cyst formation

i.e. Hge in cyst.

- Consider emergency case because of sudden compression on Trachea → Reflex spasm of pre-tracheal muscles → Impending Suffocation.

② Calcification on long standing.

③ Carcinoma [Follicular type 3%].

④ 2ry Thyrotoxicosis [30%].

⑤ (R.S.E.) Retro Sternal Extension from lower pole.

⑥ Carotid artery displacement → fainting attacks due to ↓ blood supply to the brain

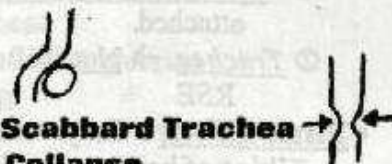
⑦ Complications of treatment.

(B) **Pressure on Trachea**

① Unilateral compression → **Kinking** of Trachea.

② Bilateral compression → Antero-posterior slit → **Scabbard Trachea** →

③ Tracheomalacia : Absorption of Tracheal rings → **Collapse**.



N.B. : Tracheomalacia is detected by :

Kocker's Test: Slight compression on lateral lobe if produces stridor this means Tracheomalacia.

The value : To get consent from patient to do permanent Tracheostomy.

* **Clinical Picture** :

- Symptoms : Slowly enlarged neck swelling i.e. Disfigurement. or Pictures of complications.

▪ Signs : Examination ⇨

(A) **General Examination** "Exclusion of Complications"

- Exclude Toxicity Pulse, ABP, Eye sign ... etc
- Exclude Metastasis (Liver, Bone, Lung & Brain) metastasis.



(B) Local Examination :**I-Inspection**

- = **Number** : usually Single.
- = **Site** : At Muscular Δ
- **Shape** : Localized or Diffused.
- **Size** : In (Cm x Cm)
- **Skin over** : Normal except dilated veins with RSE.
- **Surface** : Nodular.
- **Special sign** : Moves up & down with deglutition.

N.B. : ① Because It enclosed in Pre-tracheal fascia.
 ② Absent with Huge SNG & + RSE

- = **Edge** : Well defined edge.

N.B. : ① Seen with deglutition.
 ② Lower pole seen or not to exclude RSE.

- = **Draining L.Ns**

Upper or Lower deep cervical L.Ns seen or not To exclude (malignancy or 2ry infection).

- **Deep Relations** :

- ① Sternomastoid muscle → Not attached.
- ② Trachea. → Not shifted except if RSE

- **Distal Effects** : Only with RSE

Tilting of head to one side ($\frac{1}{2}$ min.)
 → face flushing.

II-Palpation

- = **Tenderness** : Not except infected.
- **Temp.** : At body temp.
- **Thrill** : No Thrill.
- = **Mobility** : Mobile in All directions
 - Up & down.
 - Side to side.

N.B. : Absent with huge SNG & RSE

- = (Site, Shape, Size etc...)

Same as inspection

- = **Edge** : Well defined edge.

N.B. : ① Felt with deglutition.
 ② Lower pole felt or not to exclude RSE

- = **Consistency** : Firm

N.B. : ① Hard if Calcified.
 ② Cystic if Hge in cyst.

- = **Draining L.Ns** :

Upper or Lower deep cervical L.Ns felt or not

- **Deep structures** :

- ① Sternomastoid muscle: Not attached.
- ② Trachea : Not Shifted except if RSE
- ③ Carotid artery: Felt but may be shifted if Huge SNG.

- **Deep Effect** :

(Kocker's Test)

For Tracheomalacia.

By Slight compression on lat. Lobe → Stridor → Tracheomalacia.

III- Percussion On Manubrium Sterni (Normally) Resonant.
 So Dullness = RSE.

IV- Auscultation No value

*** Investigations :**

[A] To Diagnose SNG → Thyroid scan : Cold Nodule or Nodules.

[B] To Exclude complications.

- ① Thyroid function test → To (Exclude Toxicity).
- ② X-ray for mediastinum → To (Exclude RSE) & (Calcification)
- ③ Biopsy for mass → To (Exclude Malignancy).
- ④ Neck U/S. → Multinodular + cyst or solid
- ⑤ Indirect Laryngoscopy to assess vocal cords

* Treatment :

- Indicated with (1) Bad cosmetic (3) Pressure (if Huge).
(2) RSE (4) Suspicious of malignancy.

So ∴ For single : Lobectomy + Isthmectomy i.e. Hemithyroidectomy
 ∴ For multiple : Subtotal thyroidectomy, leaving about 8 gm of normal thyroid

N.B. : ① We leave postero-medial part to preserve Parathyroid & RLN
 ② All operations followed by L. thyroxine.
 ③ Surgery Not advised below 25 year to avoid recurrency.



Retrosternal Goitre

* Types : (3 Varieties)

- ① Retrosternal Extension of large goitre :
 Downwards of thyroid gland with it's capsule
 Due to ① Pushed by Pre-tracheal muscles.
 ② Pulled by -ve Intrathoracic Pressure.
- ② Plunging goitre :
In Thorax . But appears only in neck with deglutition.
- ③ Mediastinal goitre :
In Thorax & Not appears in neck even with deglutition
 i.e. Ectopic Thyroid Tissue.



[Retro-sternal Goitre]

* Clinical Picture :

- Type of patient : more common with male due to short neck & strong muscle.
- Symptoms : Mediastinal syndrome
 (Dyspnea, Congested neck veins & Brassy cough)
- Signs : ① Inspection : a. Dilated veins on Neck & Chest.
 b. ± Can't be move up & down with deglutition
 c. Lower border can't be seen.
 d. Trachea may Shifted.
 ② Palpation : Lower border can't be felt.
 ③ Percussion : Dullness over Manubrium sterni

* Investigations :

- X-ray Chest : Shows Soft tissue shadow & Shifting of the Trachea.
- CT scan Chest : More Accurate.
- Thyroid scan (Tc^{99}) Diagnostic

* Treatment :

- Preoperative preparation : By Inderal, especially with toxic R.S.E..

N.B. : Antithyroid drugs is contraindicated because → ↑ Size of gland.

- Operative procedures : Subtotal thyroidectomy Then
 ① Deliver it to neck after devascularisation of the gland.
 ② If failed → Piecemeal removal.
 ③ If failed → Median Sternotomy.

① **Types****II Toxic goitre**① 1ry Toxic② 2ry Toxic③ Toxic Nodule① **1ry Toxic = Diffuse Toxic = Grave's = Exophthalmic Goitre**

- It is Autoimmune : Initiated by IgG antibodies stimulating TSH Receptors.

N.B. : LATS = Long Acting Thyroid Stimulator is one of these IgG or called LATS P (Protector) & Now called TsAb (Thyroid Stimulator Antibody)

& can be precipitated by stress e.g. psychic trauma, emotional stress & acute infection.

- Affect : 20 – 30 years.
- Characterized by : Diffuse enlargement (Soft, Smooth & Symmetrical)
- Mass : Occur at same time of Toxicity.
- Eye signs & Reticulo Endothelial System (RES) Hyperplasia.

② **2ry Toxic = Nodular Goitre = Plummer's disease**

- It is complicated from Simple Nodular Goitre (SNG).

N.B. : The Nodules are Inactive & Internodular tissues only active.

- Affect : 30 – 50 years.
- Characterized by : Localized enlargement (Firm, Nodular & Asymmetrical)
- Mass : Occur before time of Toxicity.
- No Eye signs (Extremely Rare).

③ **Toxic Nodule**

- It is a Solitary (Overactive) Nodule.
- It is Autonomous Characterized by
 - ♦ (Non Hormonal dependency).
 - ♦ (Hypertrophy & Hyperplasia) Not affected by TSH.
- Investigation : Thyroid Scan shows Hot Nodule.
- Treatment : Hemithyroidectomy after Control of Toxicity.

Don't Forget

* **Rare Types of Toxic Goiter :**

- ① Neonatal Thyrotoxicosis : New born of thyrotoxic mothers.
- ② Thyrotoxicosis factitia : Due to excess intake of L. thyroxine.
- ③ Jod-Basedow Thyrotoxicosis : Due to large dose of Iodine given to hyperplastic gland → Temporary ↑ T₄.
- ④ Hashitoxicosis : 5% of Hashimoto's thyroiditis in early stages are thyrotoxic.
- ⑤ Decurvan's thyroiditis : Due to liberation of Hormones from destroyed tissue.
- ⑥ Functioning carcinoma.
- ⑦ TSH secreting adenoma of the pituitary gland.

② **Clinical Picture** [Toxic Goitre]

- Age : • 1ry Toxic goitre (20-30 years).
- 2ry Toxic goitre (30-50 years).

- Symptoms **Toxic Manifestations** i.e. Hyperthyroidism

- Metabolic: ① Loss of weight Inspite of good appetite (Other causes)

- ① Uncontrolled D.M
- ② Parasitic Infestation i.e. Hydatid cyst.
- ③ Malabsorption Syndrome.

- ② Intolerance to Heat.

- ③ Excessive Sweating .

- C.V.S : Palpitation even (at Rest).

- Chest : Exertional dyspnea.

- C.N.S : ① Fine Tremors of Tongue & Hand

- ② Irritability Anxiety & Insomnia.

- ③ Weakness of Proximal Limb Muscles.

- G.I.T : Polyphagia ± Diarrhea.

- Urin ary : Polyuria

N.B. : Causes of polyuria in This case

- Glucosuria.
- ↑ Metabolic water.
- ↑ Water intake 2ry to Polyphagia.
- ↑ Renal Blood Flow.

- Skeletal : Generalized Bone aches. i.e. Osteoporosis.

- General : Diplopia of Eye or corneal ulceration.

- Gonadal : ① Impotence in Male.

- ② Menstrual Disturbance in Female.

	1ry Toxic	2ry Toxic
• <u>Age</u>	• 20 – 30 years	• 30 – 50 years.
• <u>Onset</u>	• Abrupt	• Gradual.
• <u>Course</u>	• Slowly progressive.	• Steady
• <u>Degree</u>	• Severe.	• Mild.
• <u>Exophthalmos</u>	• True	• Apparent.
• <u>Metabolic</u>	• +++	• +
• <u>C.V.S & Chest</u>	• +	• +++
• <u>C.N.S</u>	• +++	• +

- Signs : (A) General Examination

- (B) Local Examination



(A) General Examination

(A) Vital signs [Hyperdynamic Circulation]

① **Temp** : (↑) With toxic goitre.

② **Pulse Rate** (**Full comment on Radial pulse**) with Toxic goitre it is "Tachycardia, Irregular, Large volume, Equal on both sides and Water hammer pulse as Special characters". Because of (↑ Systole & ↓ Diastole).



N.B. ① All Types of Arrhythmia can occur except Heart Block.
 ② Sleep pulse means Examination of pulse during sleep
 (Mild 90 - 100/min, Moderate 100 - 110/min & Severe > 110/min)
 • The value : To exclude Anxiety & for follow up.
 ③ The pulse may be Unequal as in R.S.E.

③ **A.B.P.** : "High systole and Low diastole"

④ **R.R.** : "May be Increased"

(B) General Signs

= Appearance : Normal.

= Built : Underbuilt.

= Concious : Concious.

= Decubitus : "Orthopnea" If Heart Failure occur.

= Emotion : "Irritable & Alert".

= Face : "Staring look".



(C) Systemic Examinations

● **Head**

① Face : Flushed face.

② Tongue : For Tremors (**N.B.** Unsupported Tongue).

③ Eye : For ① Tremors in upper eye lid.

② Exophthalmos (see later).

③ Eye signs ↗.



How To Examine Eye Signs →

[1] Stellwag's sign : Staring look or Infrequent blinking
 (Normally = 5 - 8 Times / min.)

[2] Von Graefe's sign : Upper eye lid lags behind the eye on moving the eye downwards.

[3] Dalrymple's sign : A Rim of sclera is seen above the cornea on moving the eye downwards.

[4] Joffroy's sign : Loss of Wrinkling of the forehead on looking upwards.

[5] Mobius sign : Lack of Convergence on looking at near object.



Stellwag's Sign



Von Graefe's Sign & Dalrymple's Sign



Joffroy's Sign.



Mobius Sign

Don't Forget**Exophthalmos**

- ☆ **Types** : ① False : Due to retraction of upper eye lids because of contraction of Muller's muscle because of $\uparrow T_3$ & T_4 .

N.B. : T_3 & $T_4 \rightarrow \uparrow$ Sensitivity to catecholamines.

- ② **True** : (A) Moderate :

- Actual protrusion of eye ball.
- Due to deposition of Retro-orbital fluid.

N.B. : Aggravated by : Ophthalmic vein compression.

- (B) Malignant :

- Progressive form of Exophthalmos.
- Due to weakness of extra ocular muscles.

- ☆ **Aetiology** : Unknown cause but may be due to E.P.S.
(Exophthalmos Producing Substance)

☆ **How To Examine Exophthalmos** :

I To Show True or False



- [1] Naffziger Test : To see the level of Supra & Infra-orbital ridge with the cornea

- [2] Frazer's Test : To see the obliteration of sulcus of orbital margin with slight closed eye.

- [3] Ruler Test : To see the level of Supra & Infra-orbital margin with the cornea by a Ruler.

II To Determine The Degree

- [1] Exophthalmometer

- [2] Ruler : To measure distance between lateral Orbital margin and Apex of the cornea (normally = 15 - 17 mm).

- **Neck** (See local examination)

- **Upper limb** For ① Tremors of Hand i.e. Fine.
② Exaggerated Reflexes.
③ Warm Sweaty Hand.
④ Myopathy of Proximal muscles.

- **Lower limb** For Pretibial myxedema which is ⚡
• Multiple yellow patches of the skin.
• Due to mucin deposition not due to $\uparrow T_3$ or T_4 .

- **Chest** For Heart Examination shows ⚡
• $\uparrow$ Heart sound & Functional murmur over P^{++}
• Dilatation of both ventricles.

- **Abdomen** For • Liver Enlargement
• Spleen Enlargement } May be associated with
Iry Toxic goitre

☆ **Don't Forget** : (BACK)

(B) Local Examination:

1ry Toxic Goitre	2ry Toxic Goitre
Grave's (Basedow's) Disease. • Symmetrical. • Soft and Smooth. • Young (20-30years). • The Enlargement <u>at same</u> time of Toxicity. • Eye sign.	Plummer's Disease. • Asymmetrical. • Firm and Nodular. • Middle (30-50years). • The Enlargement <u>before</u> time of Toxicity • No (Extreme rare) Eye Sign

N.B. : 1ry toxic goitre characterized by

- ① Pulsation by Inspection.
- ② Thrill by Palpation.
- ③ Bruit by Auscultation.

③ Investigations

- [A] Thyroid Function Tests.
- [B] Radioactive I¹²³ Studies.
- [C] Others.

[A] Thyroid Function Tests :**□ Measurement of serum thyroid Hormones :****[1] Measurement of protein bounded iodine (PBI) :**

(It is Not used nowadays) because it is not accurate as it affected by fluctuation of serum level of plasma proteins.

SO May by (a) False High with ↑ ptn (Pregnancy).

(b) False Low with ↓ ptn (Nephrotic syndrome).

SO MEASURES FREE T3 & T4 ARE MORE ACCURATE

[2] Measurement of free binding sites for thyroid hormones in the blood (T3 Uptake Test) :

Radioactive T3 is incubated with the patient's serum → T3 will bind to the free thyroid binding proteins → Estimate the number of free binding sites in the serum.

SO May by (a) Low with Thyrotoxicosis.

(b) High with Hypothyroidism.

[3] T3 Suppression Test :

(done only if ¹²³I uptake is high).

- Normal : ¹²³I uptake by the thyroid gland can be suppressed by given T3 for 7 days.
- In Thyrotoxicosis T3 has no effect.

□ Estimation of TSH in serum :

♦ Low concentration = Hyperthyroidism & High concentration = Hypothyroidism.

□ TRH stimulating Test:

♦ To exclude hypothalamic lesion i.e ↓ TSH.

So Give I.V. TRH * If still ↓ TSH → hyperthyroidism.

* If increase ↑ TSH → hypothalamic lesion.

[B] Radioactive I^{123} studies or Tc^{99} :**□ Uptake studies :**

- Give Tracer dose (5 μ ci) then measures the uptake by gland after 4, 24, 48h
[N = 11 – 55% of Tracer dose]

So may be

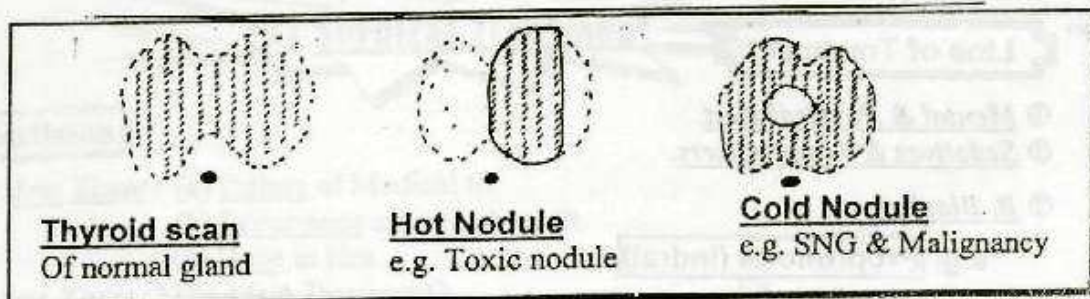
- (a) **High** uptake (> 55%) = **Hyperthyroidism**.
- (b) **Low** uptake (< 11%) = **Hypothyroidism**.

□ Thyroid scan :

After given a dose of I^{123} or Tc^{99} the radioactivity of the gland is screened by (GAMMA) camera.

Show so it → Functioning = **Hot** = Toxic Nodule.

→ Not functioning = **Cold** = SNG or Malignancy.

**[C] Others :**

- ① **ECG** to exclude Arrhythmia.
- ② Blood sugar & urine analysis for **glucosuria**.
- ③ **Serum Ca^{+} & Alkaline phosphatase** if ↑ destruction of bone matrix.
- ④ **Thyroid antibodies titre** (LATS, LATS P & TsAb) increased with grave's disease.
- ⑤ **BMR** ↑ with Hyperthyroidism.
- ⑥ **Serum cholesterol level** : ↓ with Hyperthyroidism.

N.B. : ① Investigation like BMR, PBI, Serum cholesterol level are not done nowadays.

② **T₃ Thyrotoxicosis** :

It is a case in which normal T_4 with high T_3 only, it occur with elderly & manifest with AF & heart failure.

④ Treatment

	1ry	2ry	Toxic Nodule
• Medical ttt	• Main ttt.	• As pre-operative	—
• Surgical ttt	• Failure of Med. ttt • Recurrent. • Huge in size.	• Main ttt	• Hemithyroidectomy (Isthmusectomy + lobectomy).
• I_2 radiotherapy	• If pt > 45 years.	—	• If pt > 45 years.

(A) Medical Treatment

* Indications

- ① 1ry Toxic : "All Cases".
- ② 2ry Toxic : "As Pre-operative preparation".
- ③ Children & Young patient : No surgery because of "↑ Risk of recurrence".
- ④ Refusal of operation or Bad general condition.

* Contraindications

- ① Solitary Toxic Nodule "Because it is Non Hormonal Dependent".
- ② Retrosternal Goitre "Because Medical ttt leads to ↑ Size of the gland".
- ③ Pregnancy
- ④ Lactation — "Because Medical ttt affect on Foetus leading to **Cretenoid goitre**".

☞ Line of Treatment

- ① Mental & Physical Rest.
- ② Sedatives & Tranquillisers.

③ B. Blocker

e.g. Propranolol (Inderal)

- Action : (a) Block the peripheral adrenergic features of hyperthyroidism.
- (b) Partially decrease Conversion of $T_4 \rightarrow T_3$.
- Dose : 10 – 40 mg T.D.S. Orally.

④ Antithyroid drugs :

[A] Carbimazole (Neomercazole)

- Action : (a) Prevents Oxidation of inorganic iodine.
- (b) Interfere with Binding of I_2 & Tyrosin.
- Dose : 10 mg / 8h Orally till euthyroid state
- Then 5 mg / 8h. Orally for 1 – 1.5 year.
- Onset : After 7 – 14 days
- (This means the already formed T_3 & T_4 not affected).
- Side effects (a) Aplastic Anaemia.
- (b) Agranulocytosis :
 - C/P : Sorethroat & fever are early sign.
 - ttt : Stop the drug, pencilline, fresh blood transfusion & vit. B_{12} 300mg/d

[B] Propyl Thiouracil

- Action : As Carbimazole + ↓ conversion of $T_4 \rightarrow$ more active T_3
- Dose : 100 mg t.d.s till euthyroid state then a maintenance dose 50 mg/d is given.
- Side effects : (a) Bone marrow depression.
- (b) GIT disturbance.
- (c) Joint pain.

[C] **K perchlorate**

- **Action** : It interfere with I_2 Trapping & very safe & can be used with children.
- **Dose** : 200 – 300 mg/8h.

**Other complications of Anti-thyroid drugs :**

- ① **Allergy** : Itching, skin rashes & vomiting.
- ② **↑vascularity** → Tachycardia (A-V) shunt so mislead doctor to increase the dose → Myxedema
- ③ **Myxedema** : from over dose.
- ④ **Cretenoid** : if given during lactation.

(B) Surgical Treatment

* **Indications**

- ① **1ry Toxic** : (a) Failure of Medical ttt.
(b) Recurrence after medical ttt.
(c) Huge in size.
- ② **2ry Toxic** : [The Main Treatment].
- ③ **Solitary Toxic Nodule** : i.e. Hemithyroidectomy.

* **Pre-operative preparation****[A] Long Term preparation :**

Neormercazole till reach the euthyroid state (for 2-3 months)

(Then) Lugol's Iodine (5% Iodine + 10% KI in water) →

- **Actions** : ① ↓ Protease Enz. which release T3 & T4
② ↓ Organic Iodine formation .
③ ↓ Effect of TSH on gland .
- **Dose** : 5-15 drops T.D.S for 14 days before operation .
- Side Effects** : Skin rashes, Excessive saliva & parotid enlargement.

[B] Short Term preparation :

Indral 40 mg (4 Times / day)

For 1 week pre-operative & continued for 1 week after

* **Operation** **[Subtotal Thyroidectomy]** leaving 1/8 of the gland.* **Post – operative follow up**

- ① Indirect laryngoscopy before hospital discharge.
- ② Serum Ca^{+} after 6 weeks.
- ③ Serum T3 & T4 every 6 months to detect recurrency or myxedema.

N.B. : The common post-operative complication (See later)

(C) Radioactive Iodine

* Indications

- ① Iry Toxic > 45 years.
- ② Solitary Toxic nodule > 45 years.
- ③ Recurrence of Toxicity after surgical ttt.
- ④ Poor general condition.

* Contraindications

- ① Iodine Allergy.
 - ② Young (To prevent the Risk of Carcinoma).
 - ③ Pregnancy.
 - ④ Lactation.
- (To prevent the Risk on Foetus)

☞ Line of Treatment (Radio-Iodine I^{131})

- Action : I^{131} → Destruction of Thyroid cells by Beta particle → sublethal damage.
- Dose : 160 μ ci/1 gm Thyroid tissue. [N.B. μ ci = Microcuris].
- Onset : 2-5 Months.
[If No Improvement after 3 months, Further dose is given].
- Side effects : ① Myxoedema (80% after 10 years).
② Leukaemia (Doubtful)
③ Thyroid Carcinoma

(D) Special Problems

[A] Thyrotoxic with Pregnancy

- ♦ Medical ttt : No because, It may leads to foetal hypothyroidism.
- ♦ Surgical ttt : Indicated in 2nd & 3rd trimester.
So we give minimal dose of Propranolol before surgery.
- ♦ Radio-Iodine : No because, It leads to destruction of foetal thyroid.

[B] Children & Adolescents

- ♦ Medical ttt : The Ideal.
- ♦ Surgical ttt : No to avoid high risk of Recurrence.
- ♦ Radio-Iodine : No to avoid high risk of Malignancy.

[C] Thyrocardiac Patient

- ♦ Medical ttt : As Preoperative preparation only by [Inderal or Neomercazole].
- ♦ Surgical ttt : The Ideal.
- ♦ Radio-Iodine : No Except for unfit patient for surgery.

[D] Retro-sternal Toxic Goitre

- Medical ttt : As Preoperative preparation only By [Inderal].

N.B. : Thiouracil is contraindicated because of $\rightarrow \uparrow$ size of gland.

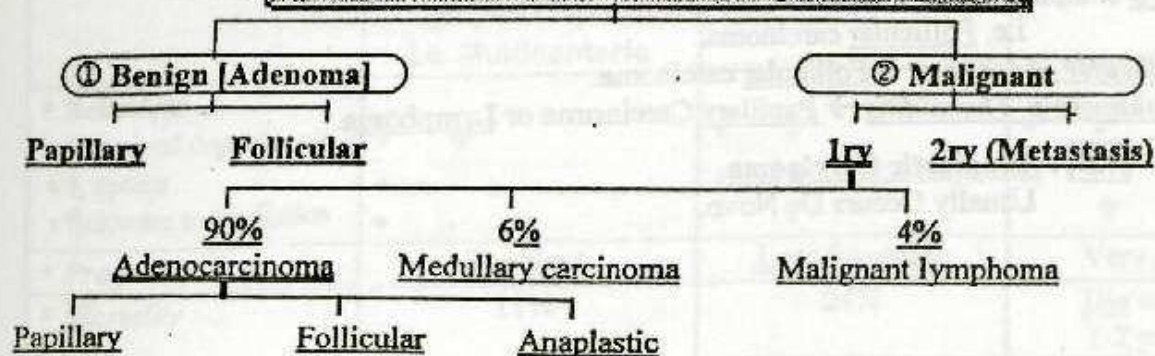
- Surgical ttt : The Ideal.
- Radio-Iodine : Not used.

[E] Exophthalmos

- Medical ttt :
 - ① Salt's Restriction & Diuretics.
 - ② L-Thyroxine may $\downarrow$ E.P.S.
- Surgical ttt : [The aim : To avoid complications]
 - ① Lateral Tarsorrhaphy.
 - ② Orbital Decompression [Moffat's operation] (Not done)
By Removal of (a) Part of roof.
(b) Lateral wall of Orbit.
- Radio Iodine : Not used.

[F] Thyrotoxic Crisis

- Incidence : Rare Nowadays, because of good preparation & control of toxicity before operation.
- Manifestations :
 - Symptoms : Muscular Excitability up to convulsion.
 - Signs : (a) Temp. = Hyperpyrexia up to 41°C or more.
(b) Pulse = Irregular & Rapid up to 160/min or more.
(c) A.B.P. = $\uparrow$ (Systole & Diastole) $\rightarrow$ Heart Failure.
- Treatment : [Should be Urgent]
 - Ice Packs to limb, head & abdomen $\rightarrow \downarrow$ Pyrexia.
 - Morphia $\rightarrow$ Sedation.
 - A.B. $\rightarrow$ To prevent chest infection.
 - O₂ Inhalation & I.V (Hydrocortison) 25mg.
 - Beta Blocker (Inderal) : I.V drips in glucose under ECG screen (Till pulse reached to normal)
 - Lugol's I₂ 3cc in 1000 cc glucose solution.

III**Tumors of Thyroid Gland**

1 Benign (Adenoma)

It may be

- ① Papillary Adenoma
- ② Follicular Adenoma which is

Follicular Adenoma



- Represent as a Solitary Nodule.
- Complicated by Follicular Carcinoma.
- Investigation [Histopathological Examination]
To detect evidence of invasion to capsule
i.e. Turn to malignancy.
- Treatment (Hemithyroidectomy)
Lobectomy + Isthmusectomy

N.B. : Follicular adenoma (5 Histological subtypes) :

① Embryonal type :

Acini without lumen.



② Foetal type :

Empty well defined acini.



③ Microfollicular type :

Well formed acini + little colloid



④ Macrofollicular type :

Well formed acini + Normal colloid.



⑤ Hurthle - cell type :

Well formed acini + granular acidophilic cytoplasm.



N.B.

Papillary Adenoma : Is usually with papillary projection inside (most pathologist consider it as malignant. So there is nothing called papillary adenoma).

2 Malignant Goitre

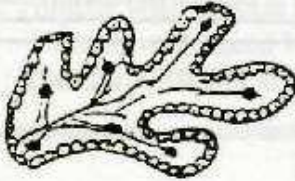
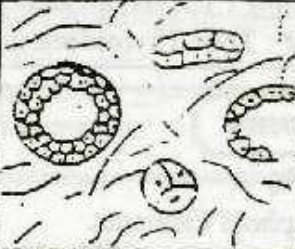
① Predisposing Factors i.e Risk Factors

- Irradiation to neck in children with T.B. lymphadenitis.
i.e. Papillary carcinoma.
- SNG complicated by carcinoma
i.e. Follicular carcinoma.
- Follicular Adenoma → Follicular carcinoma.
- Hashimoto's Thyroiditis → Papillary Carcinoma or Lymphoma.

N.B. : Anaplastic Carcinoma

Usually Occurs De Novo.

② **Types of Carcinoma**

	Papillary	Follicular	Anaplastic
▪ Incidence	60%	17%	13%
▪ Age	Children and Young Adult	Middle Age	Elderly
▪ Sex (Female : Male)	3.5 : 1	2 : 1	1 : 1.3
▪ Pathology			
• <u>N/E picture</u>	• <u>Localized</u> & slowly growing nodule.	• <u>Ill defined</u> and irregular tumor.	• <u>Large</u> & rapidly growing tumor.
• <u>Microscopic picture</u>			
	• <u>Cystic area</u> with intracystic papillary projections. • <u>Composed of C.T center</u> & covered with single layer of malignant cells with <u>Scattered Ca</u> i.e. <u>Psammoma bodies</u>	• <u>Thyroid follicles</u> with variable degree of differentiation. • <u>Vascular & Capsular</u> invasion.	• <u>Clusters</u> of spindle cells which is small or giant cells. • <u>Separated by</u> little fibrous tissue. • <u>Local</u> infiltration is seen.
▪ Differentiation	Differentiated	Differentiated	Undifferentiated
▪ Spread	• Mainly <u>Lymphatic</u> <u>N.B.</u> : It is called "Lateral Aberrant Thyroid" = Thyroid with <u>Neck</u> L.Ns Metastasis.	• Mainly <u>Blood</u> especially Bone.	• Mainly <u>Direct</u> .
▪ Multiplicity	+ve • <u>It means multiple</u> foci in same or other lobe. • <u>Due to</u> intrathyroid lymphatic spread i.e. <u>Multicentric</u>	-ve	-ve
▪ Behaviour			
• Hormonal dependency.	• +	• -	• -
• I_2 uptake	• -	• +	• -
• Response to irradiation	• -	• -	• +
▪ Prognosis	The <u>Best</u>	<u>Less</u> favorable	Very <u>poor</u>
▪ Mortality	11%	24%	<u>Die</u> within 1-2 years.

N.B. Medullary Carcinoma

- **Incidence** : 6%
- **Origin** : Parafollicular (C) cells secreting calcitonin.
- **Spread** : 50% are lymphatic spread.

Some Tumors are Familial

So form part of MEN type IIa (Slipple's syndrome). Which is
[Medullary ca. + Pheochromocytoma + Hyperparathyroidism].

- **Manifestation**: Diarrhea in 30% due to 5HT (5 Hydroxy Tyramine) also may be due to ↑ PGs.
- **Investigation** : ↑ level of calcitonin in blood.
- **Treatment** : Total Thyroidectomy + Selective Neck Node Dissection.

N.B. Lymphoma

- **Incidence** : 4%
- **Origin** : Lymphoid Elements.
(May predisposed by Hashimoto's Thyroiditis)
- **Treatment** : Radiotherapy & chemotherapy [prognosis: is good]

③ Clinical Picture of Carcinoma

- **Age** : Usually > 50 Years.
- **Symptoms** **Malignant Manifestations**
 - Rapid increase in size with short duration.
 - Pain is related to swelling or Referred to Ear.
i.e. Arnold nerve (Branch from Vagus nerve)
 - Metastasis As [Liver, Bone, Lung, Brain].
 - Symptoms of Infiltration :
 - Trachea → Dyspnea.
 - Oesophagus → Dysphagia but (Rare).
 - Sympathetic Chain → (Horner's syndrome)
(Ptosis, Myosis, Enophthalmose, Anhydrosis).
 - Carotid Artery → Postural Fainting.
 - Internal Jugular Vein → Oedema of face.
 - Recurrent laryngeal nerve → May be
 - Hoarseness of voice if Unilateral affection.
 - Stridor if Bilateral affection.

N.B. : Some patients represent 1st by L.Ns in the Neck
i.e. Occult carcinoma = Papillary carcinoma.

- **Signs** : **(A) General Examination :**

- Examine for Metastasis e.g. Bony Swelling.

- **(B) Local Examination :**

- Swelling is Tender, Hard, Irregular, Enlarged and Fixed
- "Berry's sign" (Absent carotid pulsation).
- L.Ns (Enlarged, Hard, 1st mobile Then Fixed).

③ Atypical presentation :

- Metastasis i.e. occult carcinoma.
- Thyrotoxicosis i.e. functioning carcinoma.
- AS S.N.G i.e. Low grade tumor
- Histological surprise :
i.e. suddenly discovered malignancy from histological report of a removed benign thyroid.
How to deal with (see later)

④ **Staging** De Groot staging (Philadelphia 1989) : Journal of cancer :

- * Stage I : Tumour with single or multiple intra-thyroid foci.
- * Stage II : Tumour with mobile Neck L.Ns.
- * Stage III : Tumour with fixed Neck L.Ns + local invasion of surrounding.
- * Stage IV : Tumour with Distant metastasis.

⑤ **Investigations**

[A] Diagnostic Procedures :

- Radioactive I¹²³ scan → Cold Nodule.
- U/S : For Cystic (Papillary carcinoma) or Solid.
If cystic : Do aspiration →

N.B. : Criteria of malignant Aspirate :

- Hge.
- Residual Mass.
- Rapid reaccumulation of fluid.
- +ve cytology for malignancy.

▪ Biopsy :

- FNAC "Accurate with Papillary carcinoma".
- Open biopsy i.e. Lobectomy + Isthmusectomy.

[B] Detection of Distant Metastasis :

- Lung : X-ray.
- Bone : Bone Scan (Mainly with Follicular Carcinoma).
- Liver : Sonar (U/S).
- Brain : (Extremely rare) So No investigations done.

[C] Detection of Complications :

- Laryngoscopy for RLN invasion.
- Bronchoscopy for Tracheal invasion.
- Oesophagoscopy for Oesophageal invasion.

[D] Detection of Tumor Marker :

- ↑ Serum Calcitonin = Medullary carcinoma.
- ↑ Thyroglobulin = Differentiated carcinoma.

⑥ **Treatment** According to Operable or Inoperable.

① **Inoperable case**

> Criteria of Inoperability :

- ① Unfit for surgery e.g. Cardiac disease.
- ② Patient with metastasis.

> Indicated also with :

- ① Anaplastic carcinoma.
- ② Infiltration to vital structures with papillary or follicular carcinoma.

Management

> Palliative Isthmusectomy

> According to Types :

- Papillary : give L. Thyroxin.
- Follicular : I_2 uptake
- Anaplastic : give Ext. Radiation.

> ttt of complications as :

- Tracheostomy if Tracheal invasion.
- Gastrostomy if Oesophageal invasion.

② **Operable case : "Total Thyroidectomy"**

- #### > Indications :
- ① Papillary Carcinoma : Because it is Multicentric.
 - ② Follicular Carcinoma.
 - ③ Early Anaplastic carcinoma.
 - ④ Medullary carcinoma.

> Postoperative (L. Thyroxine 0.1-0.2 mg/day) As Replacement Therapy.

> Preservation of :

- ① RLN.
- ② At least one of Parathyroid gland.

- #### > Removal of L.Ns :
- ① If No L.Ns : No need for prophylactic block dissection of L.Ns.
 - ② If few L.Ns : Selective picking of L.Ns.
 - ③ If extensive : Block Dissection of L.Ns.

> Treatment of Histological Surprise :

(1) Follicular type :

- a. Non-invasive : No further surgery if total lobectomy was done.
- b. Invasive : Re-operation to remove remnants of thyroid tissue.

(2) Papillary type :

Re-operation is necessary to remove remnants of thyroid tissue + thyroid lymph nodes.

> Postoperative follow up :

Every 6 months by thyroid scanning, clinical exam & tumor marker to detect

- ① local recurrence,
- ② Metastasis
- ③ Complications.

⑦ **Prognosis** Depending on

- ① Age > 40 years.
- ② Size > 5 cm.
- ③ Distant metastasis.
- ④ Anaplastic.



Complications After Thyroidectomy

(مهم جدا)

① **Recurrent Laryngeal Nerve Injury**

- Cause : Pressure on the nerve by ① Oedema & Blood clot.
② Accidentally ligated.
- Manifestations :
If • Unilateral paralysis → Hoarseness of voice & dyspnea.
• Bilateral paralysis → Stridor & Suffocation.

② **External Laryngeal Nerve Injury**

- Cause : Accidentally during ligation of superior thyroid vessels
- Manifestations : Loss of high pitched voice.

③ **Post-operative Thyroid crisis (storm)** Discuss : (see before)

④ **Hypoparathyroidism**

- Causes : ① Removal of all parathyroid gland.
② Interrupt with their blood supply.
- Manifestations : ① Tetany within a day.
② Typical Carpo-pedal Spasm.
- Treatment : Slow I.V Ca gluconate 10 cc 10%.

⑤ **Hypothyroidism**

Removal of too much thyroid tissue.
(It needs replacement therapy)

⑥ **Reactionary Haemorrhage**

- Cause : Result from continuous oozing (bad haemostasis).
- Manifestation : Suffocation.
- Treatment : Urgent opened wound in bed.

⑦ **Adherent Scar**

Scar adherent to the trachea.

⑧ **Increase of Exophthalmos** i.e. progressive

⑨ **Recurrence of Hyperthyroidism**

Because of Inadequate removal or Hyperplasia of that has been left.

IV Thyroiditis

[A] Inflammatory Thyroiditis

Acute Bacterial Thyroiditis

- Cause : Rare follows Bacterial infection of Mouth, Pharynx & L.Ns.
- Manifestation : Acute onset of severe neck pain, Fever & Chills.
- Investigation : Culture for rarely formed pus.
- Treatment : Antibiotics + draining of abscess which is rarely formed.

Subacute Viral Thyroiditis

"Dequervains's" Granulomatous Thyroiditis

- Cause : Viral infection.
- Manifestation : Incidious onset of severe neck pain, Fever (No Chills) + Swollen, firm & Slightly tender (pain radiate to ear).
- Investigations : ♦ ↑ ESR (Erythrocyte Sedimentation Rate).
 ♦ ↓ TLC (Total Leucocytic Count).
 ♦ Thyroid functions : ↓ I₂ uptake & ↑ production of T₄.
- Treatment : Prednison Orally

[B] Autoimmune Thyroiditis

Hashimoto's Thyroiditis

- Cause : Autoimmune (middle age female).
- Manifestations : ① Onset is Asymptomatic or Incidious & rarely acute.
 ② Mild hyperthyroidism due to destruction of thyroid follicles → Release of T₄ in blood.
 ③ Swollen, firm gland.

N.B. : It may be complicated by

- Hypofunction i.e. Excess follicular destruction.
- Carcinoma i.e. Papillary carcinoma or Lymphoma.

- Investigations : ① ↑ thyroid antibodies.
 ② Biopsy to DD from carcinoma.
- Treatment : ① Replacement therapy by L-Thyroxine.
 ② Subtotal thyroidectomy if enlarged and leading to pressure symptoms.

Riedel's Thyroiditis

Collagen disease [Woody Thyroiditis]

- Cause : Autoimmune (very rare) only 0.5%.
- Manifestations : ① Hard (woody) gland from excessive fibrosis.
 ② Infiltration to surroundings.
 ③ May be complicated by hypofunction.
- Investigation : Biopsy to DD from Anaplastic Carcinoma.
- Treatment : ① Replacement therapy by L-Thyroxine.
 ② Palliative Isthmusectomy.

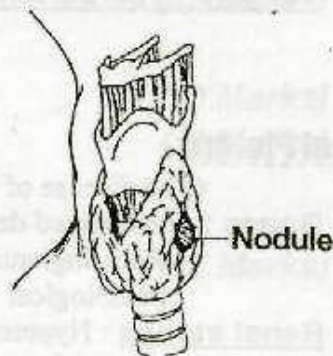
Solitary Thyroid Nodule

Definition

- A Goiter which clinically appears to be a Single Nodule. Which may be
 - ① True solitary : If one nodule is Felt & the rest of the gland is not felt.
 - ② Dominant : If one nodule is felt & the rest of the gland is slightly felt.

Aetiology

- ① Simple nodule.
- ② Toxic nodule.
- ③ Neoplastic nodule : a. Adenoma.
b. Carcinoma.
- ④ Colloid nodule



How to Differentiate?

- ♦ History (onset, course & duration) of each cause.
- ♦ General & Local Examination (for Toxic or Metastatic or Pressure manifestations).
- ♦ Investigations :

[A] Laboratory :

- * Thyroid function tests : ↑ in Thyrotoxicosis.
- * Thyroid antibodies titre : ↑ in 1ry Thyrotoxicosis or Thyroiditis.

[B] Thyroid scan :

- * Hot nodule : Toxic nodule.
- * Cold nodule : More suspicious of malignancy.

[C] Neck U/S :

- * To differentiate cyst from solid + Aspiration (criteria of malignancy).

[D] Biopsy :

1. **FNAC** : It is very useful in papillary tumor but can't differentiate benign from malignant follicular lesion.
2. **Tru cut needle biopsy** (Another option).
3. **Excision biopsy** : the only diagnostic with Hemi-thyroidectomy

[E] Tumor Markers : if suspicious of malignancy.

Treatment

According to the underlying aetiology :

- ① If cyst → Aspiration → malignant criteria → proceed to surgery.
- ② If benign condition → Hemi-thyroidectomy is enough.
- ③ If Malignant condition → proceed to Total thyroidectomy if hemi-thyroidectomy was done before.

Parathyroid Glands

Hyperparathyroidism

* Aetiology : (3 Types)

- ① 1ry hyperparathyroidism : (The commonest variety) it is due to adenoma 80% or carcinoma.
- ② 2ry Hyperparathyroidism : Secondary parathyroid hyperplasia due to hypocalcaemic states e.g. chronic renal failure, malabsorption syndrome
- ③ Tertiary hyperparathyroidism : With prolonged stimulation the reactive hyperplasia acquires autonomy it secretes excess hormone without stimulation.

* Clinical Picture :

(The disease of Bones, Stones, Abdomen and psychic moans)

- ① Bones : Generalized decalcification of bones = *ostitis fibrosa cystica* (Von Recklinghausen's disease) → multiple bone cysts → pathological fractures.
- ② Renal stones : Hypercalcaemia & phosphaturia cause recurrent renal stones & nephrocalcinosis.
- ③ Abdomen : Increases gastric & pancreatic secretion by hypercalcaemia may precipitate Peptic ulceration or Acute pancreatitis.
- ④ Psychic moans : Common in women. Restlessness, irritability, personality changes and even neurosis may occur.

* Investigations :

① Investigations for hyperparathyroidism :

- Serum Ca^{++} & PO_4 : $\uparrow Ca^{++}$ $\downarrow PO_4$.
- Urinary Ca^{++} & PO_4 : $\uparrow Ca^{++}$ $\uparrow PO_4$.
- Radio immune assay for parathormone, $\uparrow PTH$
- X-ray bone : multiple bone cysts



② Investigation for localization of parathyroid glands :

- Ultrasonic scan :
- CT scan (Very helpful)
- Thallium²⁰¹ Technetium⁹⁹ subtraction scan :

The Idea of this test is that Tcm^{99} is taken only by thyroid gland while Thallium²⁰¹ is taken by both thyroid & parathyroid gland by computerized subtraction of the two captured images, the parathyroids appear as hot spots.

* Treatment :

- ① Parathyroid adenoma → Resection of the adenoma.
- ② Parathyroid hyperplasia → Resect the 4 glands and implant part of one in sternomastoid muscle to facilitate its re-exploration if needed.



Final Written Exams



1994

- Discuss Anatomy of Thyroid Gland
- Discuss C/P, Investigations & ttt of Toxic Goitre
- Discuss path., Investigations & ttt of Malignant Thyroid

(10 Marks) دور ثانی

(15 Marks) دور ثانی

(30 Marks)

1995

- Give an account on Complication of SNG

(15 Marks)

1996

- Discuss Complication & ttt of SNG
- Discuss Complications of Thyroidectomy

(10 Marks)

(15 Marks) دور ثانی

1997

- Discuss the ttt of Diffuse (1ry) Toxic Goitre

(15 Marks)

1998

- Discuss Anatomy of the Thyroid Gland.
- Discuss Path. of Cancer Thyroid. What are the differences between the commonest 3 types. (Table form comparison)

(10 Marks) دور ثانی

(15 Marks) دور ثانی

1999

- Discuss post-operative Complications of thyroid gland
- Discuss C/P of Thyrotoxicosis

(15 Marks) دور ثانی

(15 Marks)

2000

- Discuss Post-operative complications of Thyroid gland
- Discuss Origin, C/P & Treatment of Thyroglossal cyst.
- Discuss Pathology, C/P & Investigation of R.S.G.

(10 Marks) دور ثانی

(10 Marks)

(10 Marks)

2001

- Discuss complications of S.N.G.
- Mention DD & Investigations of solitary thyroid nodule.

(10 Marks) دور ثانی

(15 Marks)

2002

- Discuss Post-operative complications of thyroid gland
- Discuss complications of S.N.G.
- Discuss Management of solitary nodule

(10 Marks) دور ثانی

(12 Marks)

(12 Marks)

2003

- Discuss complications of S.N.G.
- What are risks & precautions with toxic goiter
- Discuss thyroglossal cyst
- Discuss path, C/P & management of cancer thyroid

(9 Marks) دور ثانی

(9 Marks) دور ثانی

(9 Marks) دور ثانی

(20 marks)

2004

- Discuss Anatomy of thyroid gland
- Discuss clinical presentations of Hyperparathyroidism

(20 marks) دور ثانی

(20 Marks) دور ثانی

The Arterial Disorders

ISCHAEMIA

[Diminished Arterial Blood Supply]

Limb Ischaemia

Definition

Diminished arterial blood supply sufficient to interfere with nutrition and functions of the Limb.

Aetiology

Due to arterial occlusion by trauma or vascular disease.

Types

It may be

- Acute Ischaemia.
- Chronic Ischaemia

The Effect of Ischaemia Depend Upon

- ① The Degree of Arterial Occlusion :
 - Partial : Mild Ischaemia.
 - Complete : Severe Ischaemia.
- ② The rate of arterial occlusion :
 - Acute : Sudden Ischaemia.
 - Chronic : Gradual Ischaemia.

N.B. : Acute ischaemia more serious

Because No time for development of Collaterals.

③ The Type of artery for (Collateral Circulation).

- Some arteries have good collaterals as Subclavian artery & Iliac artery.
- Other arteries have poor collaterals as Brachial artery & Popliteal artery.

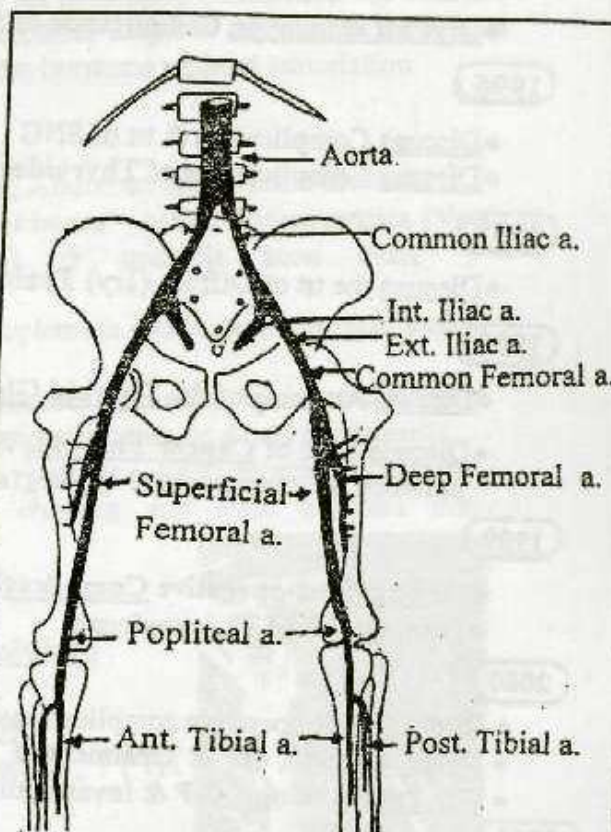
④ Heart failure → ↓ Cardiac output → ↑ Ischaemia.

⑤ Anaemia → ↓ O₂ → ↑ Ischaemia.

⑥ Smoking → ↑ Ischaemia.

⑦ Alcohol → Improve collateral circulation.

⑧ Cold weather → Maintain spasm → ↑ Ischaemia.



The Arterial Blood Supply of the Lower Limb

I ACUTE ISCHAEMIA

Definition

Sudden Total occlusion of a previously patent artery supplying a limb.

Aetiology

- ☆ (A) - Embolism "The Commonest".
- ☆ (B) - Arterial Injuries.
- (C) - Acute Thrombosis On Top of Atherosclerosis.
- (D) - As Complication of Dissecting Aneurysm.
- (E) - Phlegmasia Alba Dolens.
- (F) - Compression on Artery e.g. Tourniquet, Fractured bone etc...

Pathology

- a- Sudden occlusion of an artery → Reflex spasm of the near by vein → Tissues will be loaded with fluid → [If Gangrene] it will be moist aseptic.
- b- Different Tissues Tolerate Ischaemia to variable Extent :
 - Muscle → Irreversible damage within 6 hours.
 - Skin → Moist aseptic gangrene within 24 hours.

Clinical Picture

[6PS] + History of embolism or trauma
+ muscle (Tender, Swollen, tense)

- Pain : ♦ Sudden onset.
- ♦ Bursting or Cramp like in character.
- ♦ Starts at point of occlusion.
- ♦ Shoots distally.
- ♦ ↑ By Movement or Warmth.

N.B. : The pain may be absent in some patient
Because of rapid onset of anaesthesia.

- Pallor : Which is replaced (later on) by Mottled Cyanosis due to accumulation of deoxygenated blood. in capillaries
- Pulselessness.
- Paraesthesia : Cutaneous hyposthesia progresses slowly to be frank anaesthesia.
- Paralysis ▪ Paralysis : e.g. Paraplegia occur with occlusion of "Aortic Bifurcation".
- Progressive coldness

Clinical → Capillary circulation (capillary bed pulsation)

+ Volkmann's isch. Contracture.....

① Fixed Colour Change Blue staining
② muscle necrosis (Tense calf m.)
③ Acute Paraplegia (saddle aortic embolism)

Complications

(Irreversible acute Ischaemia)

Sequelae of Acute Limb Ischaemia

- **Secondary Distal Thrombosis**: After circulatory arrest → widespread distally → Intravascular Thrombosis.
may proximal
- **Peripheral Oedema**: especially after revascularization, because of associated thrombus (DVT) of the affected limb. Also the clot may dislodge & ↑ risk of pulmonary embolism.
- **Nerve Ischaemia**: Impaired nerve conduction.

N.B.: Nerve damage never occur

- **Muscle**: [Compartmental Syndrome = Muscle Compression Syndrome]
 ◦ Prolonged ischaemia → Oedema → ↑ Pressure inside the fascial compartments of the leg especially after Revascularization → ↑ Impairment of arterial flow → ↑↑ Ischaemia.

N.B.: Irreversible Muscle damage within 6 hours

- **Skin**: Gangrene occur if skin neglected without treatment. (moist)

N.B.: Gangrene occur within 24 hours

Incomplete Recovery: Leads to development of clinical picture of chronic Ischaemia.

A Arterial Embolism

[Embolic Ischaemia]

* **Definition**: Sudden impaction of an embolus in a narrow blood vessels.

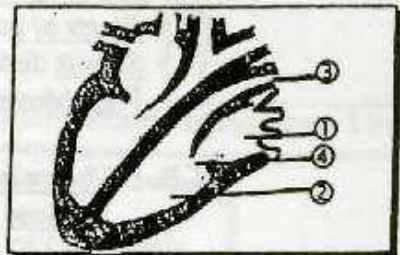
* **Incidence**: Commonest with cardiac patient.

[Congenital, Rheumatic H.D, Infarction or Valve lesion].

* **Pathology**: See before +

A Source of an Embolus

- ① **Lt. Atrium**: MS with AF.
- ② **Lt. Ventricle**: After Recent infarction
- ③ **The Aorta**: From an Aneurysm.
- ④ **Valves**: If Subacute Bacterial Endocarditis.
- ⑤ **Paradoxical Embolism**: (Rare) If ASD or VSD.
- ⑥ **Atheromatous plaque** from atheromatous vessels
- ⑦ **Rare**: Air, Fat, Amniotic fluid, Clot or Tumor cells.



B Site of Impaction (Bifurcation of vessels) Due to

- ① Decreasing in Diameter.
- ② Slowing in Blood Circulation.
- ③ Turbulence of Blood Flow.

N.B.: **Saddle Embolus**: Embolus impacted in the aortic bifurcation



* **Clinical Picture :**

As before [6PS] But ↗

- Examination of heart may reveal the cause.

* **Complications :**

As Before But ↗

- Gangrene is more common because of poor collaterals due to ↗

- ① Reflex V.C of Collaterals.
- ② 2ry Thrombosis including Collaterals.
- ③ Showers of embolism may block Collaterals.

Claudication Pain ×
Heart
Age
Angiography
Radial pulse
Trophic change
Source of embolism

* **Differential Diagnosis :**

- ① Acute Arterial Thrombosis i.e. Thrombotic Ischaemia.

	Embolitic Ischaemia	Thrombotic Ischaemia
History		
• <u>Personal H.</u>		
• Age	• Common with <u>Young</u> .	• Common with <u>Elderly</u> .
• <u>Present H.</u>		
• Onset	• Sudden.	• Gradual.
• Source of Embolus	• Present.	• <u>Absent</u> .
• <u>Past History</u>		
• Heart disease	• Present.	• <u>Absent</u> .
• Claudications	• <u>Absent</u> .	• Present.
Inspection		
• <u>Trophic Changes</u>	• <u>Absent</u>	• Present
Palpation		
• <u>Radial Pulse</u>	• <u>Irregular</u> with A.F.	• Regular
Investigation		
• <u>Angiography</u>	• <u>Minimal</u> Collaterals	• <u>Marked</u> Collaterals

- ② Phlegmasia Alba Dolens. Massive venous thrombosis of Ilio-femoral vein with Arterial spasm.

* **Investigations :**

- ① To Detect The Source of an Embolus : (Evidence of valvular lesion).

- ECG.
- Echocardiography.

- ② To Detect the Level of Arterial Obstruction : (Angiography).

- Doppler U/S.
- Duplex Scanning.

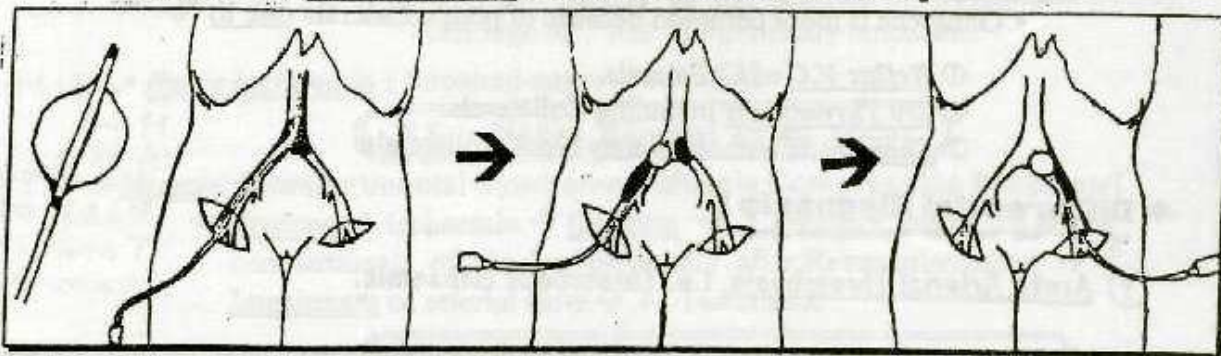
* **Treatment :** →

Treatment [Embolism is a Surgical Emergency]**(A) Urgent Embolectomy :** *② I.V. fluid → to correct Dehydration*

• **Anaesthesia** : Better under local anaesthesia (may be spinal anaesthesia).

with order ⇒ • **Pre-operative** : Immediate Heparinization → Prevention of propagated thrombus

• **Operative** : [**Embolectomy**] [**Fogarty Balloon Catheter**]



• It must be within 6 hours to save the limb.

But if done after that time called **Delayed Embolectomy**

• The only value of Delayed Embolectomy is lowering the level of Amputation.

Because of irreversible muscle damage which occurs

• Complications of Embolectomy & It's treatment ⇨

Complications	Treatment
(1) <u>Sudden Death</u> Due to pulmonary Embolism. Because of venous spasm → Thrombosis → Pulmonary embolism → <u>Death</u> .	① <u>Thrombectomy</u> of femoral vein at same time of embolectomy. ② <u>Putting IVC Filter</u>
(2) <u>Compartmental syndrome</u> i.e. Muscle Compression Syndrome As before.	• <u>Fasciotomy</u> Done to save the vitality of the limb i.e ↓ Tension.
(3) <u>Reperfusion injury</u> (Kidney & Heart). Due to passage of large amount of Myoglobin & K^+ from ischaemic Muscles leads to Renal Shutdown or Cardiac Arrest	① <u>I.V. Mannitol</u> → ↑ Diuresis ② <u>I.V. Insulin + Glucose</u> → ↑ intracellular shift of K^+ ③ <u>Dialysis</u> If Anuria.

N.B. : In case of :

(a) Femoral Bifurcation Block → Femoral Arteriotomy

(b) Aortic Bifurcation Block → Bilateral Femoral arteriotomies

with order ⇒ • **Post-operative** : Heparinization (Continued till cardiac conditions is assessed)

③ detect & correct source of emboli ⇒ Till the cause

N.B. : A Completion Angiogram (should be done)

• To be sure that all emboli have been removed.

(B) Fibrinolysis:

(Recent) i.e. No surgery.

▪ As Streptokinase, Urokinase & Tissue Plasminogen Activator (TPA).

▪ They are given I.V or I.A through a catheter.

N.B. Heparin should not be used at same time.

(C) Amputation : If Established gangrene.

(B) Arterial Injury

* Definition : Sudden interruption of arterial supply of the limb by injury

* Incidence : Common Nowadays due to ⚡
 [↑ Car Accidents, ↑ War Injuries & Iatrogenic as Invasive Investigations].

* Aetiology : The Injury may be.

▪ Open injury : Stabs, Bullets etc...

▪ Closed injury : ① Plaster or Tourniquet Compression.

② Following Arterial Cannulation.

③ Fracture Dislocations with Arterial injury

e.g. Supracondylar fracture Humerus with Brachial a. Injury.

or supracondylar fracture Femur with Popliteal a. Injury.

* Types :

Arterial Injury

Without Division (No Bleeding)

(A) Arterial Spasm

• Due to Arterial Irritation by blunt trauma or missile near the artery.

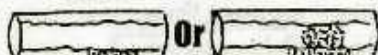
• Associated with Intimal Tear but not diagnosed as a cause except after exploration.



(B) Arterial Contusion

• Due to ^{Closed injury} Arterial contusion

• Associated with ± Superadded thrombosis.



With Division (Bleeding)

(A) Complete Division

• Both Ends bleed profusely but soon the bleeding decreases because of ⚡

♦ The intima Curls inside Lumen.

♦ The Media Contracts.

♦ The Divided Stumps Retract.

• The pulse is lost Distally.

(B) Partial Division

• The Bleeding will continue → (Pulsating Haematoma) the bleeding not stopped because of Contraction & Retraction of the arterial wall. → getting of tear → Bleeding

• The pulse is weak Distally

* Pulsating Haematoma → False Aneurysm (Trauma)

* External or internal

* Arterial & Venous injury → A.V. Fistula (Not Common)

looks like *CP of Ischemia 6P*

*** Clinical Picture :**

looks like → **• History of Trauma**

• **General Exam** as vital signs to evaluate the blood loss.

• Local Exam

(A) **Hard signs**: as before [6PS]

(B) **Soft signs**: not specific because of small or moderate sized Haematoma that not pulsating

*** Investigations :**

[A] In patients with Hard signs :

Immediate surgical exploration is indicated.

[B] In patients with Soft signs :

(1) Plain X-ray : to detect foreign bodies (bullets) or fractures.

(2) Doppler & Duplex : to detect collaterals.

(3) Angiography : The most Accurate

*** Treatment :**

(A) First Aid Treatment :

▪ **Temporary control** of bleeding by ① **External Compression**.

② **Elevation of Limb**.

③ **Tourniquet** : Simple, Rubber or pneumatic.

▪ **4 Anti** ① **Anti-shock measures**.

② **Anti-biotics**.

③ **Anti-tetanic serum**

④ **Anti-gas gangrene serum**.

▪ **Associated fractures** must be fixed to **stabilize** the repair

(B) Definitive Treatment : [I] Immediate Exploration + Flushing Artery by Heparin Saline
[II] Fasciotomy (to prevent Compartmental Syndrome)

Then According To Types of Arterial Injury :

① Arterial Injury without division :

[A] **Arterial Spasm**: ① Intra-arterial injection of papaverine.

② Intra-arterial injection of **Heparin** in saline

• **If Not successful :**

Forcible dilatation by **Fogarty Catheter** is performed.

• **If Not successful :**

Arteriotomy to detect intimal tear.

If present → **Excise** the spastic segment then **saphenous vein graft** is performed.

[B] **Arterial Contusion**: **Excision** of contused segment then **saphenous vein graft** is performed.

interposition graft

② **Arterial Injury with Division :**

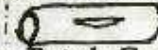
(Non absorbable ← *دیس*)
 Prolene → *سریس*

[A] **Complete Division :** • No gap: Direct End to End Anastomosis.• Gap : • Small Artery :

Natural (Saphenous vein) Graft.

• Large Artery :

Synthetic (Dacron or Teflon) Graft.

[B] **Partial Division :** • Longitudinal Tear → • Small Artery: Vein Patch Graft. *Patch sh*• Large Artery: Direct Suture.• Transverse Tear → • < 1/2 Circumference: Direct Anastomosis• > 1/2 Circumference: Turn it into Complete.**N.B. : Don't Forget :**

- Damaged main veins should be repaired.
- Damaged Nerves can be repaired or left for another sitting

II**CHRONIC ISCHAEMIA****Definition**Slowly Progressive Arterial Obstruction.**Aetiology**[A] Above 45 years :

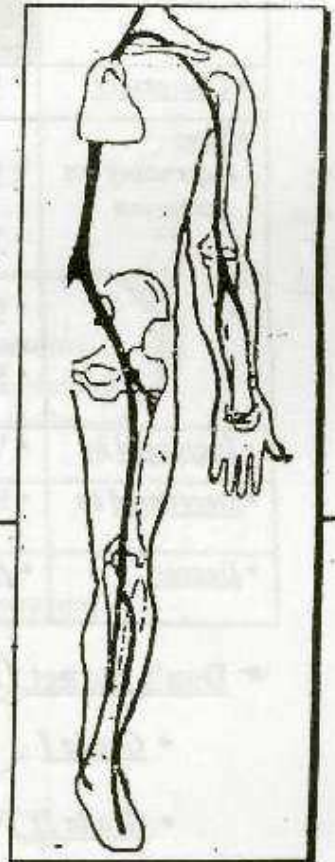
Atherosclerosis is the commonest cause.

[B] Below 45 years :* In non Diabetics :

- In Males : Burger's disease i.e Arteritis.
- In Females : Raynad's disease i.e vasospastic disease.

* In Diabetics :

Diabetic foot & Gangrene.

**A****Atherosclerosis***** Definition :**

Degenerative arterial disease due to aging process affecting the whole arterial system.

*** Incidence :**

- Age : > 40 years.
- Sex : Male > Female
- Risk Factors :
 - Hypertension
 - Hypercholesterolaemia
 - Hypertriglycerides
 - Obesity
 - +ve Family H.
 - Heavy Smokers

* Pathology :

▪ It is a Generalized Disease :

Affecting Large & Medium sized vessels.

▪ The 1st pathology called "**Atheroma**" :

① Started as an elevated yellow plaque on the **Intimal surface** of the artery.

② Subintimal layer shows Accumulation of lipid & C.T matrix.

③ The Media & Adventitia shows fibrosis.

N.B. : The plaques may be calcified so be apparent by (x-ray).

* Clinical Picture : *Very important*

"Press And See How Colour Fades" • P (Pain).

PS *Color fades Green*
23 2

- A (Arterial pulsation).
- S (Skin & Sensory changes).
- H (Lost Hotness).
- C (Colour changes).
- F (Functional changes).

+ Gangrene + special test

(P) = Pain

	Intermittent Claudications "Muscle Ischemia"	Rest Pain "Nerve Ischaemia"
• <u>Characters</u>	• <u>Cramp Like pain</u>	• <u>Burning pain</u> <i>severe burning during rest</i>
• <u>Site:</u> <i>Depending on occlusion</i>	• <u>Gluteal</u> = Claudications due to $\rightarrow$ Aorto-iliac Occlusion. • <u>Thigh</u> = Claudications due to $\rightarrow$ Ilio-femoral Occlusion. • <u>Calf</u> = Claudications due to $\rightarrow$ Femoro-popliteal Occlusion. • <u>Sole</u> = Claudications due to $\rightarrow$ Popliteo-tibial Occlusion.	• <u>Foot (Dorsum > Sole)</u> Because of dorsum of foot <u>less</u> vascular <u>than</u> sole so more affected than sole.
• <u>Increased by</u>	• Walking & Warmth	• Elevation of limb & Warmth
• <u>Decreased by</u>	• Rest <i>(start to relax)</i>	• Lowering or Uncovered limb or Rubbing the dorsum of foot.
• <u>Degree</u>	• According to $\rightarrow$ [Boyd's Classification]	• Continuous and Severe i.e. <u>pregangrene</u> .

• Don't Forget : **Boyd's Classification**

- Grade I $\rightarrow \downarrow\downarrow\downarrow\downarrow$ = Pain starts on walking but gradually $\downarrow$ by walking so $\rightarrow$ Good Collaterals i.e. mild ischaemia.
- Grade II $\rightarrow \downarrow\downarrow\downarrow$ = Pain starts on walking and gradually $\uparrow$ by walking so $\rightarrow$ Poor Collaterals i.e. moderate ischaemia.
- Grade III $\rightarrow \downarrow$ = Pain starts on walking but force the patient to stop walking so $\rightarrow$ Severe Ischaemia.

N.B. : Intermittent Claudication Pain Also Characterized by :

- **Claudication Distance:** Distance after which the pain is felt. The shorter the distance the advanced ischaemia.
- **Claudication Time :** Time after which the pain is felt.
- **Rest Time :** Time of Rest needed to start walking again.

(A) Arterial Pulsation :

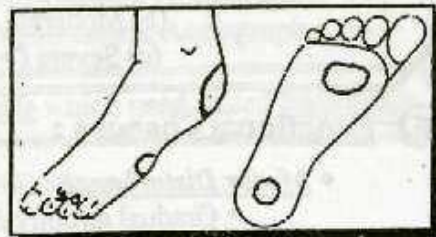
[All accessible Arteries all over the body are palpated]

- **Distal Arterial Pulsation** → May be diminished in amplitude or absent

(S) ① Skin Changes :

[Trophic Changes]

- Loss of Hair, brittle Nail and dry scaly Skin.
- Interdigital infection. i.e. Tinea Pedis.
- Ulceration over pressure sites e.g. site of big toe, heel & tips of toes, also tapering digits



② Sensory Changes :

- Paraesthesia "Gradual loss".
- Tingling & Numbness.

(H) Coldness (Lost Hotness) :

[Examine Temperature]

- Should be bilateral starting with normal limb.
- Before examination of temp. let the limb uncovered for 5min.
To avoid false covered warm limb.

N.B. : Causes of False warm ischaemic limb :

- | | |
|------------------|----------------------------------|
| ① Covered limb. | ③ Under ttt by Sympathectomy |
| ② Infected limb. | ④ D.M. "Auto-sympethetomized pt" |

- Detect the level of change of temp = level of obstruction.
By palpation from distal to proximal

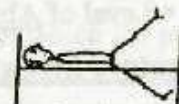
(C) Colour Changes :

[The pt. is lying down and exposed his both LL from groin downwards]

- Normal Colour indicates → Mild ischaemia.
- Postural Changes indicates → Moderate ischaemia.

☆ **Burger's Test** (Elevate the limb gradually)

- Normally, limb not affected by elevation.
- Elevation of ischaemic limb cause Pallor.
- Lowering of ischaemic limb cause Cyanosis.



N.B. : Burger's Angle : It is angle at which.

Limb becomes pale on elevation from horizontal.

So : The Smaller the angle the advanced ischaemia.

- Fixed Colour indicate → Severe ischaemia (Pregangrene).

Rubor (Capillary Blood) →

Special test?

N.B. : ① Capillary Circulation Test : (When we press on nail bed 2 sec)

- **Normally :** Blanching then rapid return to normal colour.
- **If Delayed :** Ischaemia. *Sluggish capillary circulation*
- **If No Return :** Gangrene.
(even the black colouration not present).

N.B. : ② Harvey's Venous Refilling Time :

- **Elevate** the limb till vein empty then allow dependency and record time of filling veins. *Vein from heart due to loss of subcutaneous fat.*
- **Normally :** (5-10) sec.
- **IF (a) Mild** (10-30) sec.
- (b) **Moderate** (30-120) sec.
- (c) **Severe** (>120) sec. i.e. > 2min. (Pregangrene)

F Functional Changes :

- **Motor Disturbance**
 - Gradual atrophy & loss of strength of the muscles.
 - 1st muscle showing atrophy of the lower limb is **Vastus Medialis** muscle
- **Sexual Disturbance** = Impotence [**Leriche's Syndrome**] *Saddle shape thrombus*
 - Aorto-iliac block with occluded both internal iliac arteries → Occlusion of **Median Sacral Artery** which supplying nerve erigentes (S_{2,3}) which responsible for **Erection**. *Internal pudendal*

*** Investigations :****1 Clinical Investigations :****(I) Clinical Tests To Determine the Degree of Ischaemia :**

- **Degree of Pain :** ① Claudication Time.
② Claudication Distance.
③ Rest Time.
- **Colour Changes :** ① Burger's Test & Angle.
② Capillary Circulation Test.
③ Venous Filling Time.

(II) Clinical Tests To Determine the Level of Ischaemia :

- **Site** of Claudication Pain.
- **Leriche's Syndrome.**
- **Level of Coldness.**
- **Level of Absent pulse.**

2 Laboratory Investigations :**(I) Urine Analysis :** For **Sugar**.**(II) Blood :**

- Complete **Blood** picture for **Anaemia**.
- **Blood Sugar Curve** for **D.M.**
- **Blood Urea & Kidney Function Tests.**
- **Serum Cholesterol & Lipid.**

3 Radiological Investigations :

(I) Arteriography [The Main Methods].



- Indicated if Direct Arterial Surgery is indicated.
- Value : Shows ① The Condition of arteries.
② The Site & Length of obstruction.
③ The Collateral circulation.
④ Distal Run off (أهم) i.e. distal flow beyond the occlusion.

- Methods : ① Direct Percutaneous Femoral Arteriography.
② Direct Trans-lumbar Aortography. *if common iliac*
③ Ante-grade Trans-brachial Aortography. *if aorta*
④ Retro-grade Trans-femoral Aortography. *Other femoral*

N.B. : The Needle which used called Seldinger.

- Hazards : ① Dissecting Aneurysm.
② Haemorrhage.
③ Spasm & Thrombosis.
④ Dislodgement of plaques = Embolism.
⑤ Idiosyncry to the dye. (Anaphylaxis)

(II) Digital Subtraction Angiography [D.S.A]

- Less Invasive.
- The dye is injected I.V to reach the heart then Computerized subtraction image.
- Needs computer for inter-pretation.

(III) Magnetic Resonance Angiography

- Less Invasive.
- No dye used.
- More recent & More accurate.

4 Instrumental Investigations :

(I) ECG & ECG Stress Test: (Demonstrating) ∞

- The Coronary Arterial Disease.
- The Condition of Myocardium.

(II) Doppler Ultrasound : (It's value) ∞

♦ To Detect

- ① The blood flow along an artery in which the pulse palpable or not,
- ② Degree of ischemia.
- ③ Site of obstruction.

♦ To Measure (Ankle-Brachial pressure index)

Which is the Ratio between pressure in both ant. Tibial Artery i.e. (Ankle) & Brachial Artery Which is normally > 1 . $\rightarrow 1, 2$

- If < 0.9 = mild to moderate ischemia .
- If < 0.7 = severe ischemia .
- If < 0.3 = Impending gangrene .

So

LL > UL

(III) Coloured Duplex :

- ♦ The most important investigations.
- ♦ It combines imaging of vessels & reveal blood flow.
- ♦ Coloured image shows
 - ① Blood flow.
 - ② Degree of ischemia.
 - ③ Site of obstruction (Image)
 - ④ State of collaterals (Image)
 - ⑤ Velocity of the flow.

(IV) Plethysmography :

- ♦ Through application of a cuff over the limb, which is attached to a painter over a drum.
- ♦ It can draw a curve representing the changes which depend on the arterial flow in the limb.

*** Treatment :****(A) Conservative [No Rest pain + Distal Run off]**

Indication -

(B) Endovascular surgery

- Percutaneous Transluminal balloon Angioplasty (PTA)
- Arterial Stent.
- LASER Angioplasty.

(See below)

(C) Operative [Surgical]**Rest Pain****Run off****(Arterial Reconstruction)**

- Thrombo-end Arterectomy
 - Arterial By pass
- Fit → **Anatomical By pass**
Unfit → **Extra-anatomical By pass**

① Direct
② Sympathectomy
③ Other

No Run off**(No Arterial Reconstruction)**

- Profundo-plasty
 - Sympath-ectomy
 - Gangrene + Toxaemia
- Fit → **Surgical**
Unfit → **Chemical**
↓
Amputation

interfere with work Sign of Arteriosclerosis

① Incomplete Circulation

① Limb Salvage

② Gait

③ Ischemic Surgery

④ (Rest Pain + Buerger's angle $< 30^\circ$ + Ankle Brachial Pressure Index) < 0.3

Direct Artery Surgery

A Conservative ttt

- **Indications :** ① Mild Ischaemia • No Rest pain.
 - Distal Run off (Feasible).
- ② Contraindicated to surgery as pt. With Heart Lesion. or Advanced malignancy

▪ Methods :

(A) Relief of Symptoms

① Improve General Health & Tissue oxygenation :

- Correction of Anaemia.
- Correction of Any associated lesion e.g. Heart Lesion.

② Pain Relief :

- Claudication pain : Morphia (Better Avoided) i.e. Addiction.

③ Protection of Ischaemia Parts :

- Carefully Washed, Dried & Powdered ischaemic parts , interdigital fungus with uses of Suitable Shoses. *rubbing*
- Nail & Corns are cut continuously. *Trimming of nail* *Analgesics*

④ Improve Blood Supply :

- V.D. drugs as Trental or PGE₁.
- Antiplatelets Aggregation as Persantine or Aspirin *(low doses)*

(B) ↓ Progression of the disease

- ① Stop smoking & Regular exercise i.e. Burger Exercises
- ② Proper control of D.M, Hypertension ...etc

B Endovascular surgery Intervention Radiology

▪ Indications :

Day case surgery (No hospital stay)

① Suitable only for localized occlusion in a large & medium sized vessels.

② Suitable for unfit for surgery.

But restenosis or thrombosis may occur later.

▪ Methods :

① Percutaneous Transluminal balloon Angioplasty (PTA)

- A special balloon catheter is introduced at site of narrowing of the blood vessel. The balloon is inflated to dilate the stenosed segment.

- Rarely successful with arteries below knee or segment > 10cm.

② Arterial Stents : (After balloon dilatation)

A stent is introduced to keep the lumen patent.

③ LASER Angioplasty :

Destruction of the atheromatous plaque by LASER. Through vaporization.

→ SE → lead to Thrombosis

* 1+3 good Because Patient is high risk (old age)



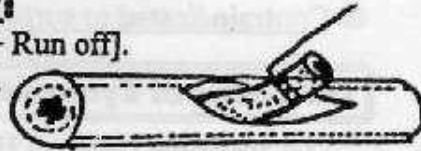
Surgical ttt

1 Arterial Reconstruction : Indicated with [Rest pain + Run off]

→ General Condition → Good

[A] Thrombo-endo-arterectomy:

- **Indications**
 - ① As Above [Rest pain + Run off].
 - ② Localized Obstruction.
 - ③ Large Arteries.



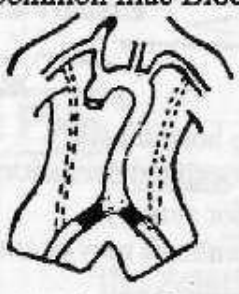
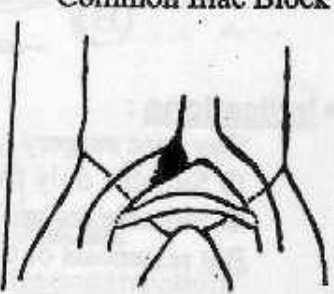
- **Technique** :
 - ① Arteriotomy then Removal of thrombus & thickened atherosclerotic intima leaving a patent lumen.
 - ② Before closing, The distal intima should be attached to arterial wall by interrupted sutures to prevent its dissection later on.
 - ③ After closing the patent lumen will be endothelialized.

- **The Instrument** which is used called [Arterectomy Loop].

[B] Arterial By Pass :

- **Indications** :
 - ① As above [Rest pain + Run off].
 - ② Multiple Lesions.
 - ③ Large & Medium sized Arteries.

▪ **Technique** :

Anatomical By pass (Fit Patient)	Extra-anatomical by pass (Unfit Patient)	
e.g. Aortoiliac Block	e.g. <u>Bilateral</u> Common Iliac Block	e.g. <u>Unilateral</u> Common Iliac Block
e.g. Femoro-popliteal Block		
	• Axillo-femoral Graft	• Femoro-Femoral Grafts

▪ **Types of Grafts** :

① Synthetic Grafts [e.g. Aorto-Iliac Graft].

- It may be (a) Teflon or Dacron.

- (b) Poly Tetra Flouro Ethylene (PTFE).

② Natural Grafts [e.g. Femoro-Popliteal Graft].

- It may be (a) Reversed long Saphenous Vein

N.B. : Reversed to avoid obstruction by its valves.

- (b) In situ long Saphenous Vein

N.B. : Valves are destroyed by a stripper.

2 Non Arterial Reconstruction : Indicated with [Rest pain + No Run off]

[A] Profundoplasty:

- **Indications** ① As Above [Rest pain + No Femoro-Popliteal Run off].
② Narrowing of Profunda Femoris Artery (P.F.A) With superficial femoral block.
- **Technique :** Dilatation of (P.F.A) to give adequate blood supply to lower limb Using venous patch.
- As Atherosclerosis may affect the ostium of the profunda only the main trunk is healthy.



[B] Lumbar Sympathectomy :

- **Indications :** ① As above [Rest pain + No Run off].
② After Amputation to help wound healing.
- **Technique :** ① Fit : (Surgical)
(Preganglionic Section of L_{2,3} Ganglia).
② Unfit : (Chemical)
(Paravertebral Block of L_{2,3} Ganglia).
(a) Temporary: 1% Lignocain as test to show patient suitable or not to surgical sympathectomy.
(b) Permanent: 5% Phenol in H₂O

N.B. : Lumbar Sympatectomy Contraindicate with

- Gangrene i.e. Ineffective.
- Intermittent Claudications if severe.

[C] Amputation : There are 2 Possibilitites

[I] Conservative Amputation

- **Indications :** ① If Good blood supply of adjacent tissues..
② If Line of separation & demarcation are well defined.
- **Technique :** ① Excision at line of demarcation.
② The skin should be neither redundant nor undertension.

[II] Urgent High Amputation

- **Indications :** ① If Spreading gangrene.
② If Uncontrolled Infection & Toxaemia.
- **Technique :** ① (A.K.A.) Above Knee Amputation
② (B.K.A.) Below Knee Amputation → Proximal. Distal

(B) Arteritis

☆ ① **Burger's disease** "See below"

② *Infective Arteritis* may leads to aneurysm.

③ *End. Arteritis Obliterans* of (S & rarely T.B) not seen because of successful treatment.

④ *Takayasu's Arteritis* (Auto immune disease, affect young female & Treated by Cortison).

⑤ *Polyarteritis Nodosa* (Collagen disease, Associated with Scleroderma & Systemic Lupus).

⑥ *Purpuric flumenans* i.e. Purpuric arterities.



Burger's Disease

[Thrombo-Angitis Obliterance]

★ **Definition :**

Inflammation & Thrombosis of small arteries and veins with perivascular fibrosis which blends (Artery, vein & Nerve) into one mass, causing early Neuritis & Severe Rest pain.

★ **Aetiology :**

Unknown But may be initiated by Spasm & followed by thrombosis & perivascular fibrosis.

The Aetiology of spasm is mainly due to Smoking.



★ **D.D :**

	(I) Atherosclerosis	(II) Burger's disease
(1) <u>Incidence</u>	♦ <u>Common</u> (> 40 years). ♦ <u>Males</u>, possibly <u>Females</u>.	♦ <u>Rare</u> (< 40 years). ♦ Male 95%.
(2) <u>Pathology</u>	♦ Atheroma & Thrombosis. ♦ <u>Calcification</u>.	♦ Inflammation & Thrombosis ♦ <u>No</u> Calcification
(3) <u>Clinical Picture</u>	♦ <u>No</u> Upper limb ischaemic sympt. ♦ <u>No</u> Superficial Thrombophlebitis ♦ <u>Calf</u> Claudication. ♦ <u>Absent</u> (Popliteal pulse). ♦ <u>Late</u> Rest pain & <u>Massive</u> gangrene ♦ <u>No</u> Raynaud's Phenomenon	♦ Upper & <u>lower</u> limb are involved. ♦ Superficial Thrombophlebitis. ♦ <u>Sole</u> Claudication. (Early) ♦ <u>Present</u> (Popliteal pulse). ♦ <u>Early</u> Rest pain & <u>limited</u> gangrene ♦ Raynaud's Phenomenon.
(4) <u>Investigations</u> ♦ X-ray. ♦ Arteriography	♦ Calcification. ♦ Irregular Narrowing of main arteries. ♦ Proximal <u>block</u> & distal <u>Run off</u>.	♦ <u>No</u> calcification. ♦ <u>Not</u> needed because of Distal block with <u>no</u> run off.
(5) <u>Treatment</u>	♦ Stop Smoking → ↓ Disease. ♦ Arterial by pass (The Main). ♦ Sympathectomy (<u>No</u> Value). ♦ Urgent High Amputation.	♦ Stop Smoking (The Main). ♦ Arterial bypass (<u>No</u> Value). ♦ Sympathectomy (The <u>Best</u>). ♦ Conservative Amputation.



Vasospastic Disorders

☆ ① Raynaud's Disease "See below"

② Acrocyanosis.

③ Causalgia.

④ Erythrocynosis Frigida (Bazine Disease)

⑤ Erythromylagia.

⑥ Sudeck's Atrophy.



Raynaud's Disease

* Definition :

Vasospastic disease affecting digital arteries.

* Incidence :

It affects young female, Bilaterally & In Cold Weather.

* Aetiology :

Unknown, But may be arteriolar over-sensitivity to Cold.

N.B. : The Spasm is not due to sympathetic overactivity

* Clinical Picture :

▪ During the Attacks : (3 phases).

- Pallor : Due to Arteriolar spasm

N.B. : Pain is Dull aching

- Cyanosis : Due to spasm → ↑ Metabolites → Congestion & Cyanosis.

N.B. : Pain is Burning

- Rubor : The attacks end & the arterioles relax.

N.B. : Pain is disappeared

▪ Between the Attacks : (Normal)

▪ In Late Cases :

- Trophic Changes : ① Brittle Nail.
② Loss of Hair.
③ Dry & Scaly Skin.

- Superficial Ulcer

- Dry gangrene of digits tips

* Management : Only successful in early cases.

- Conservative Treatment : [Avoid Cold + Vasodilator drugs as Trental].

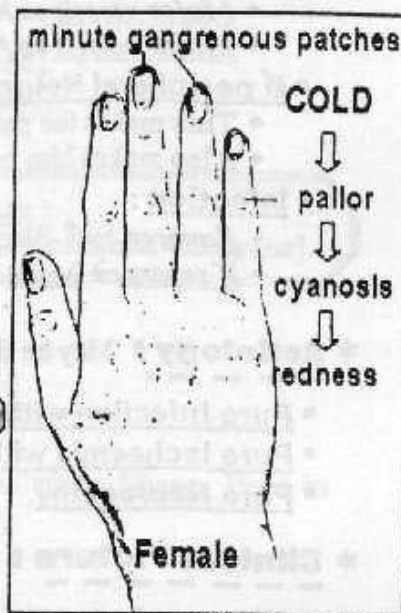
- Sympathectomy : With severe cases.

➤ Good result immediately occur but after few months, mild sensitivity to Cold returns. i.e. Raynaud's disease not due to sympathetic overactivity.

N.B. : Raynaud's phenomenon = (known cause) 2ry to

- ⑥ Occupations using vibrating tools as Drills, typists or pianists. Or associated with certain disease as Burgers, Rheumatoid arthritis & Thoracic outlet syndrome

- ⑥ Treatment : Change the occupation (No value of sympathectomy) + V.D





Diabetic Foot Infection & Gangrene

* **Definition :** Diabetic patients are susceptible to serious foot infection & gangrene.

* **Predisposing Factors :** It may be

▪ **Vascular affection :**

- ♦ Major vessels as Atherosclerosis i.e. Diabetic Macroangiopathy.
- ♦ Minor vessels as Arteritis i.e. Diabetic Microangiopathy.

▪ Diabetic peripheral Neuropathy :

- ♦ This makes the patient unaware of injuries.
- ♦ Also makes him neglect the Trophic changes.

▪ **Infection :**

- ♦ Favored by ↑ Blood sugar which act as good media for infection.
- ♦ If severe → Moist septic gangrene.

* **Aetiology :** May be due to one of the following or Mixed

- Pure Infection with No vascular affection → Moist septic gangrene
- Pure Ischaemia with No infection → Dry gangrene.
- Pure Neuropathy.

* **Clinical Picture :**

- History of minor trauma of Diabetic foot.
- Foot infection, Offensive odour & Black discoloration if gangrene occur.
- Complication as Osteomyelitis.

* **Investigation :**

- Urine Analysis & Blood Sugar Curve for D.M.
- Culture & Sensitivity for Discharge.
- X-ray on foot for Osteomyelitis.

* **Management :**

[1] Prevention : Treatment of all Predisposing Factors.

[2] Active Treatment : [Diabetic foot infection not successfully controlled except after draining of pus].

- ① Draining of pus.
- ② Proper controle of D.M.
- ③ Antibiotics according to Culture & Sensitivity Test.
- ④ Excision of gangrenous parts.
- ⑤ Glycerin Magnesia dressings.

N.B. : No Role of Sympathectomy because pt. is Auto-sympathectomized.

[3] Treatment of complication :

- ♦ Conservative Amputation if osteomyelitis.
- Or ♦ Urgent High Amputation if marked gangrene & toxæmia.



Gangrene

* **Definition :** Death & Putrefaction of a Macroscopic Tissue.

* **Aetiology :** It may be

- ① Try to Arterial obstruction [Acute or Chronic].
- ② Venous gangrene "Phlegmasia Cerulæ Dolans".
- ③ Neuropathic gangrene "Leprosy"
- ④ Infected : [Infective & Gas gangrene & Gas gangrene].
- ⑤ Traumatic : [Direct (bed sore) & Indirect (injury)].
- ⑥ Physiochemical : [Burn & Frost bite].

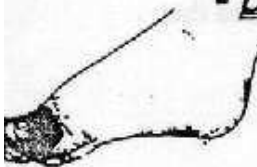
N.B.: The commonest 2 causes are :

[~~Ø~~ Infective Gangrene & Atherosclerotic Gangrene].

* **Clinical Types :** According to the Cause :

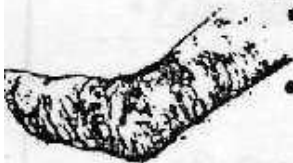
▪ **Dry Gangrene :**

- Occur with Chronic Ischaemia.
- Characterized by : Shrunken in Size, Wrinkled in Shape, Hard in Consistency & No Odour.



▪ **Moist Aseptic Gangrene :**

- Occur with • Acute Ischaemia i.e. Reflex spasm of near by vein.
- Chronic Ischaemia i.e. On Top of pre-existing oedema as H.F.
- Characterized by: Swollen in size, adematous, Mild toxaemia & offensive odour without pus gangrene spreads rapid.



▪ **Moist Septic Gangrene :**

- Occur with infected gangrene i.e. Diabetic foot
- Characterized by : Swollen in size, adematous, Marked toxaemia & offensive odour with pus-gangrene spreads very rapid.

* **Sequelae :** Progression of gangrene : [one of these may occur].

▪ Death from progressive spread & severe Toxaemia.

▪ If Blood Supply Adequate for Adjacent Tissues :

- Line of Demarcation occurs between dead & living tissues. Which is a band of hyperaemia & Anaesthesia.
- Line of Separation occurs At which the dead tissues start to fall which is ulceration & guttering appears & deepens off to continue the separation.

▪ If Blood Supply Poor for Adjacent Tissues :

- Line of demarcation, appears very slowly i.e. vague.
- No Line of Separation, Because gangrene spread by skip patches.

* Cardinal signs :

5 cardinal signs of local death are :

1. Loss of pulsation .
2. Change of skin colour into blue and later black.
3. Loss of heat .
4. Loss of sensation.
5. Loss of function.

The sentence "Press and See How Colour Fades" is a good reminder of these signs.

* Special varieties of gangrene :

[1] Senile (Atherosclerotic) gangrene

- The gangrenous process is usually precipitated by slight trauma
- The onset is often preceded by signs and symptoms of progressive ischaemia, such as intermittent claudication pain .
- The slough may separate leaving an ulcer.
- The big toe is the commonest site for the onset of the disease which spreads to the foot or neighbouring toes.

[2] Traumatic gangrene:

Due to local injury , and or bed sores.

- (A) Crushing: leads to moist gangrene. Amputation is performed close to the damaged part to leave a useful limb.
- (B) Bed sores (decubitus ulcers) affect bed-ridden patients

Decubitus Ulcer (Bed Sores)

Precipitating Factors :

- 1) Pressure of the bed over bony prominences.
- 2) Pressure of Plaster cast or Thomas splint over the skin.

Commonest sites:

Sacrum, ischeal tuberosity , greater trochanters , heels & scapular blades.

Treatment:

[A] Prevention :

- 1) Soft bed, water or air mattress.
- 2) Pressure areas protected by air tyres.
- 3) Repeated turning of the patient with massage of the back with alcohol or talk powder.

[B] Curative:

Repeated dressing with glycerine Magnesia to help slough separation

[3] Venous qangrene:

This is a rare condition caused by extensive thrombosis of the ilio-femoral (phlegmasia cerulea dolens).

* Treatment of gangrene: See Amputation (page 154) .

E**Arterial Aneurysm**

It may be (True, False or A/V fistula).

* **Definition:** Sac filled with blood & communicating with the lumen of an artery.
or Thrombus

* **Classifications:** They can be classified according to I, II and III

(I) Aetiology of the Aneurysm▪ **Congenital:**

① Commonest in Circle of Willis (Berry's Aneurysm) → Sub-arachnoid Hge.

▪ **Acquired:** (A) Pathological: The Commonest Causes:

- ♦ Atherosclerosis: (The commonest cause Nowadays).
- ♦ S, affect Aortic Arch.
- ♦ Subacute Bacterial Endocarditis → Infected Emboli → Mycotic Aneurysms.
- ♦ Collagen Disease e.g. Behcet Disease, Marfan' Syndrome.

(B) Traumatic:

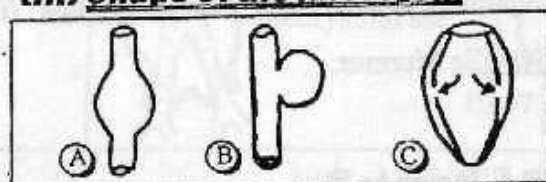
- ♦ Weakening of the all of the artery and dilatation later (True Aneurysm).
- ♦ Interruption of the wall leading to Pulsating Haematoma which when organised forms an aneurysm (False Aneurysm).

(II) Structure of the Aneurysm

- **True aneurysm:** The wall of the aneurysm is formed by the stretched wall of the artery (3 layers). (media - intima - Adventitia)
- **False aneurysm:** The wall is formed of fibrous tissue due to organization of pulsating haematoma.

(III) Shape of the Aneurysm

- (A) Fusiform.
(B) Saccular.
(C) Dissecting.



Don't Forget

False Aneurysm**[Pulsating Haematoma]**

- **Definition:** Extravasated blood from partial torn artery.
- **Aetiology:** Trauma.
- **Mechanism:** Trauma → Blood filled sac which communicating the Torn artery & Lined with compressed surrounding Tissues.
- **Clinical Picture:** → As True Aneurysm
- **Complications:**
- **Treatment:** Evacuation (Not Excision) Then arterial repair by suture.

* **Clinical Picture :** May be Silent

A General Examination

- To Detect the Cause e.g. \$, Atherosclerosis, SBE ...etc

B Local Examination

Inspection :

- Usually Single, Along the Course of an artery, variable in size & Rounded in shape with Smooth surface.
- Expansile pulsation are Seen.
- Proximal pressure Reduces the size & pulsation of the aneurysm.
- Distal pressure Increases the size of the aneurysm.

★ Compression on adjacent structures

Oedema (i.e. Compression of main veins), Colour & Trophic changes (i.e. compression of main Artery) & Paralysis (i.e. compression of nerve).

Palpation :

- Usually Single, Along the Course of an artery, variable in size & Rounded in shape with Smooth surface.
- Expansile pulsation are Felt with systolic thrill which propagated distally.
- Moves side to side Across but not along the course of an artery.
- Compressible (but Absent if filled with a thrombus).

★ Compression on adjacent structures

Oedema (i.e. compression of main veins), The distal pulse is delayed or weak (i.e. compression of main Artery) & sensory loss (i.e. compression of nerve).

Auscultation : Systolic Murmur.

★ Complications : It may be

[A] Intrinsic ① Rupture : The Most serious.

② Infection → Suppuration → Rupture → Haemorrhage.

③ Thrombosis or Embolisation with detached thrombi.

④ Distal Ischaemia due to : (a) Thrombosis of the aneurysm.

(b) Compression on Main artery.

(c) Embolization.

(d) Associated Atherosclerosis.

[B] Extrinsic ① Compression Vein → Oedema & Varicosities.

② Compression on Artery → Ischaemia Changes.

③ Compression on Nerve → Impaired Sensation ± Paralysis.

④ Compression on Bone → Erosion may occur.

Used also in Aortic

Abd. mass → Pseudo aneurysm cyst → Aneurysm of Aorta
by knee elbow position. Rotation disappears - incision

*** D.D. : Aneurysm must be differentiated from**

- **Transmitted Pulsation** : which is Characterized by :
Not expansile, pulsation disappears if you push it away from the artery
& Not ↑ in size if you compress the artery distally e.g pseudo-pancreatic cyst.
- **Pulsating Tumor** : e.g. Vascular Sarcoma. (Arterio Sarcoma)
Irregular in shape, Ill defined, Not compressible & Not overlies the line of main artery.
- **A-V Fistula** : Which is Characterized by :
Machinery (continuous) murmur propagated Distally + Proximally,
Tachycardia & Brannham's sign +ve.

N.B: If Clotted Aneurysm must DD from Anatomical L.Ns

*** Investigations :**

- **Plain X-ray** : For Calcified plaques or Eroded bone.
- **Arteriography** : Useless if Clotted aneurysm. Angiogram & DSA
- **Sonar & CT scan** : The Choice.
- **Duplex Scanning**.

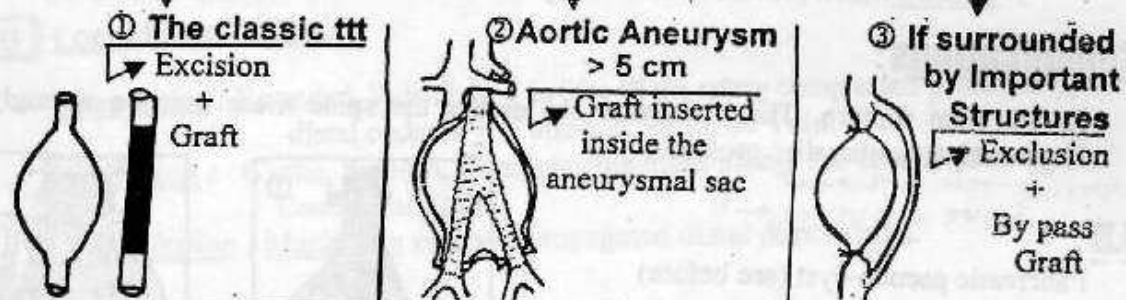
*** Treatment : According to Type of artery.**

[I] Aneurysm in Unimportant artery. radial artery

Proximal & Distal Ligation

[II] Aneurysm in important artery

main or end



Dissecting ⇒ Excision because lead to severe pain

N.B. : Aneurysmorrhaphy : Types

- ① **Restorative Aneurysmorrhaphy** :
For saccular aneurysm, excision of aneurysm & closure of the defect by venous patch.
- ② **Reconstructive Aneurysmorrhaphy** :
For fusiform aneurysm, excision of aneurysm & closure of the defect by multiple sutures over a catheter which is removed before the last suture.
- ③ **Obliterative Aneurysmorrhaphy** :
Obliteration of the aneurysm if unimportant artery.



Abdominal Aortic Aneurysm (AAA)

* Incidence :

- The commonest Arterial Aneurysm
- Age : 50 - 60 Years
- Sex : Male > Female

* Aetiology :

Atherosclerosis is the commonest cause (95%).

* Clinical Picture :

[A] Asymptomatic (75%)

Discovered accidentally during a routine radiological study for other reason.

[B] Pain :

As the Aortic Aneurysm is gradually enlarged & compress the surrounding structures causing vague Abdominal pain. Backache

[C] Symptoms of rupture :

[Classic Triade of (AAA)]

- 1- Acute upper abdominal pain: Which present in flanks or back.
- 2- Pulsatile Abdominal Mass : Which is usually tender. It may be masked by obesity or abdominal distension.
- 3- Shock : which present at time of rupture.

* Complications :

Rather than rupture. The Aneurysm can erode the spine these may be wrongly diagnosed as lumbar disc prolapse.

* D.D :

Pancreatic pseudo-cyst (see before)

* Investigations :

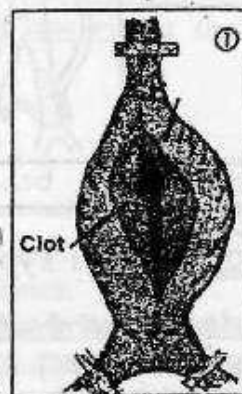
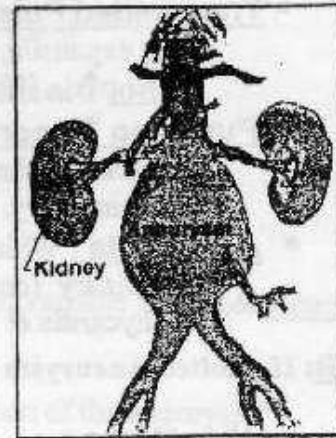
As before Spiral C.T.

* Treatment :

- If Asymptomatic & < 5 cm followed by sonar / 6 months.
- But if > 5 cm → surgical graft inserted inside the Aneurysm

N.B

Endoluminal stented graft is indicated with high risk patient who can not tolerate general Anaesthesia.





Arterio-Venous Fistula

* Definition :

Abnormal Connection between an Artery & a Vein.

* Types :

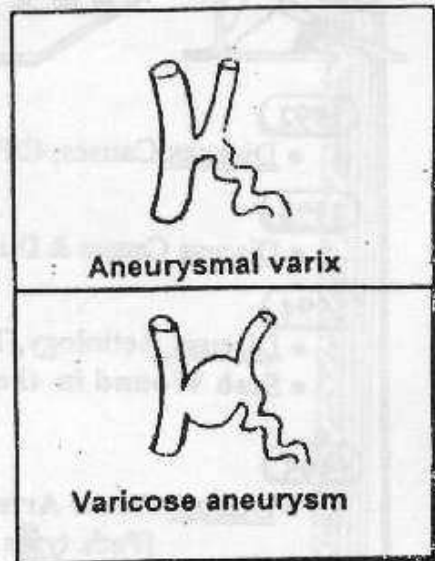
It may be ➤

- Aneurysmal Varix i.e. Direct Communication.
- Varicose Aneurysm i.e. False sac Communication.

* Aetiology :

It may be ➤

- Congenital [Local Gigantism].
 - Usually Small & Multiple.
 - Common at lower limb → Giant limb.
- Acquired
 - Trauma : Stab, Bullet ...etc
 - Artificial : During Haemodialysis in Chronic Renal Failure.



* Clinical Picture :

A General Examination :

For Tachycardia, Water hammer pulse ...etc i.e. Hyperdynamic Circulation.

B Local Examination :

Inspection : Rounded, Pulsating, ↓ in Size (if the artery compressed proximally) & distal oedema + Pulsating Varicose Vein.

Palpation : Cystic, Smooth, Compressible mass along the course of artery & Continuous Thrill.

Auscultation : Machinery murmur propagated distal & proximal.

Special Test : **[Branham's Sign]**

Slowing of Heart Rate as soon as the Fistula is compressed.

* Investigation : Arteriography, Doppler & Duplex.

* Complications :

Chronic ischaemia, 2ry V.V., Heart failure & if ruptured → bleeding

* Treatment :

According to the cause ➤

- Congenital : No surgery except if Single → Excision + Vascular repair.
- Acquired : Excision + vascular repair.

[If Failed] → Ligate Proximally & Distally i.e. quadruple ligation. then by pass graft.

N.B. : Gel foam embolization may be used in small fistula





Final Written Exams



1992

- Discuss Causes, C/P & ttt of Acute Ischaemia of L.L (15 Marks)

1993

- Discuss Causes & Diagnosis of Chronic Ischaemia of L.L (10 Marks) دور ثانی

1994

- Discuss Aetiology, Types & C/P of Arterial Aneurysm (15 Marks)

- Stab Wound in the Femoral Triangle :

Complications and Management (10 Marks) دور ثانی

1995

- Discuss Acute Arterial Injury as regards (15 Marks)

[Path. types & C/P (Not including sequelae)].

- Discuss Aetiology, Path., C/P & Investigations of Embolic gangrene. (20 Marks) دور ثانی

1996

- Mention Causes & Discuss complications of Acute Ischaemia Lower Limb. (15 Marks)

1997

- Discuss the Diagnosis of Acute Ischaemia (15 Marks)

1998

- Discuss the Classification of Arterial aneurysm (15 Marks) دور ثانی

(According to aetiology, structure and shape), C/P & Complications

1999

- Discuss causes & complication of Acute limb ischaemia (15 Marks) دور ثانی

- Discuss C/P & Complications of Aortic Aneurysm (15 Marks)

2000

- Discuss Arterial Embolism of lower limb (20 Marks)

2001

- Discuss Aetiology, C/P of Aneurysm (10 Marks)

2002

- * Discuss Aetiology & C/P of Acute embolic Ischaemia of lower limb (12 Marks)

2003

- * Mention C/P, investigations of Burger's disease (12 Marks) دور ثانی

- * Discuss types & diagnosis of arterial injuries (12 Marks) دور ثانی

- Discuss path, c/p & management of Diabetic foot & gangrene (20 marks)

2004

- Discuss Aetiology, Types, C/P & management of Arterial injuries (20 marks) دور ثانی

Chapter [12]

Venous Diseases

Chapter [12]

Venous Disorders

① DVT

② Varicose Vein

③ Superficial
Thrombophlebitis

I

Deep Venous Thrombosis (DVT)

* Definition :

DVT means thrombosis in the deep veins.

* Types :

	Phlebothrombosis	Thrombophlebitis
Definition	Thrombosed <u>un</u> inflamed veins	Thrombosed inflamed veins
Causes	Stasis or hyperviscosity	Draining inflamed organs
Site	Common with leg veins	Common with pelvic veins
Size of 1ry thrombus	Small	Large
Emboli	Common & Sterile	Rare & Infective.

* Incidence : [Risk Factors].

- Common (>50%) after operations as Prostatectomy & fracture Neck femur.
- Common site is Calf veins because of Being valveless & sinusoids.

* Aetiology :

▪ [Virchow's Triad]

[1] Changes in Vessel Wall i.e. Endothelial Damage.

Either Trauma to venous wall e.g. During pelvic operations.
Or Inflammatory process near the vein e.g. pelvic sepsis.

[2] Changes in Blood Flow i.e. Venous Stasis

Either Prolonged Recumbancy As shock or Heart failure.
Or Venous Compression by Tumor or Pregnant uterus.

[3] Changes in Blood Composition i.e. Hypercoagulability.

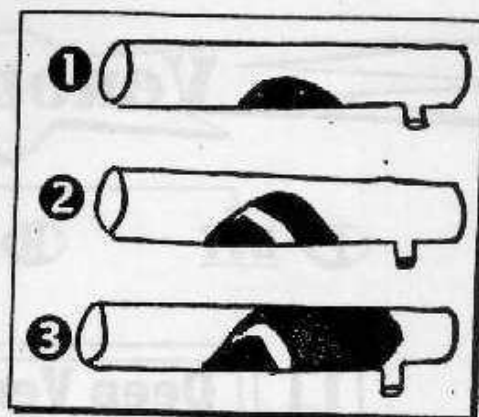
Either Oral contraceptive pills or polycythaemia.
Or Deficiency of (Antithrombin III) or deficiency of protein C & S
which are normal anticoagulant

- Other Causes as : Old age & Previous DVT.

* Pathogenesis :

▪ Early Stages :

- ① The Process usually starts in the Calf venous sinuses by adherence of platelets to the endothelial surface forming a Gry Cluster.
- ② Fibrin & RBCs are deposited in a layer between platelets giving Line of Zahn.
- ③ When The vein is totally occluded. The Jelly-Like Propagated thrombosis spreads upwards as far as the near major tributary.



N.B. : At This Stage, pulmonary Embolism occurs because of loosely attached thrombus.

▪ Late stages :

- ④ The Thrombus becomes tightly adherent to the venous wall producing Destruction of valves + occlusion of lumen = Post-Phlebitic Limb.
- ⑤ Reconalization occur by fibrinolysis but the valves are permanently destroyed.

* Clinical Picture :

▪ Asymptomatic group i.e. Most of cases are Silent or unexplained fever & Tachycardia

▪ Symptomatic group

- Pulmonary Embolism may be the 1st manifestation.
- The Classic picture
 - ① Pain : Aching discomfort related to Calf or Thigh.
 - ② Swelling i.e. Oedema (The reliable physical sign).
 - ③ Tenderness on pressing muscles against bone.

N.B. : Symptoms & Signs depend on the level of thrombosis

So There are [4 Possibilities] ➤

1 Deep Calf Veins Thrombosis : [The Commonest]

- Site : Affects Venous Sinuses of Calf muscles especially Soleus.
- C/P : Tenderness & Tense oedema affect Calf muscles.
- Exam. : Homan's sign
(Sudden dorsiflexion → Calf pain by stretching veins)

N.B. : Homan's Sign (Not done)

To avoid spread of thrombus to circulation.

2 Femoral Vein Thrombosis : [Less Common]

- Site : Affects Leg & Distal Thigh.
- C/P : Severe Tenderness.
- Exam. : Femoral vein Felt as a Tender, Firm Cord in femoral Δ.

N.B. : Femoral Vein Thrombosis

Occur as an extension of Deep Calf Thrombosis

3 Ilio-Femoral Thrombosis : [Rare]

- Site : Affects all lower limb.
- C/P : The worst manifestations.
- Exam. : [According to The severity] ➔

(A) Phlegmasia Alba Dolans : "Painful White Limb"

- Partial Venous Obstruction "less severe".
- Pallor due to associated arterial spasm.
- Complicated by Coldness & Diminished pulsation

(B) Phlegmasia Cerulæ Dolans : "Painful Blue Limb"

- Complete Venous Obstruction "More severe"
- Cyanosis due to (No Venous Return).
- Complicated by Venous gangrene.

4 I.V.C Obstruction : [The Rarest]

- Site : Affects Inferior Vena Cava.
- C/P : Manifestations affect both legs.
- Exam. : Dilated Veins on Groin.

*** D.D :**

- ① Contusion of Calf muscles : Confirmed by History.
- ② Rupture of Plantaris muscle : Excluded by Venography.
- ③ Other causes of leg swelling : e.g. local gigantism, A.V fistula, cellulites
osteosarcoma, venous odema or lymphatic odema.
- ④ Other Causes of Leg pain

- | | |
|-------------------------------------|---|
| • <u>Arterial</u> = Ischaemic pain. | • <u>Muscle</u> = Myopathy. |
| • <u>Venous</u> = DVT & V.V. | • <u>Bone</u> = Osteomyelitis. |
| • <u>Lymphatic</u> = Tender L.Ns. | • <u>Joint</u> = Osteoarthritis & Osteoarthritis. |
| • <u>Nerve</u> = Sciatica. | • <u>Ligament</u> = Flat Foot. |

*** Investigations :**

- ① Venography : Most important but if reliable.
Deep veins are opacified & thrombi appears as filling defect
- ② Doppler U/S proves absent flow in completely obstructed leg veins & show incompetent perforators (Accuracy 85%)
- ③ Coultured Duplex shows an image of veins & determine the direction of blood flow (Accuracy 90-100%).
- ④ Radio-iodine labeled Fibrinogen :
 - Before Technique : Give KI to block Iodine uptake by thyroid gland.
 - Technique : Labelled fibrinogen with I₁₂₅.
Will incorporated in newly forming thrombi which can be detected by scanning over it [so can't detect already formed thrombi].
 - Value : It can be repeated daily, so that it is useful for follow up.



* Complications :

▪ Early Complications:

- ① Pulmonary Embolism :
- ② Venous Gangrene with Phlegmasia Cerulae Dolans

▪ Late Complications :

- ① 2ry Varicose Vein.
- ② Chronic Venous Insufficiency [Post-Phlebitic Syndrome]
 - Cause (follow Ilio-femoral Thrombosis & Not Deep Calf Thrombosis) due to ↑ pressure in Deep veins i.e Reflux of blood from occluded deep veins. (Blow out syndrome)
 - Characters
 - ① Extensive and indurated, i.e. Lipodermatosclerosis (Inverted Champagne bottle)
 - ② Non pitting oedema (Fibrosis) & venous ulcer
 - ③ High pressure in superficial veins occurs during walking (Walking Venous Hypertension)
 - Complications of venous ulcer :
 - Malignancy "Marjoline ulcer"
 - Periostitis : If fixed to tibia.
 - Talipes Equinus.

* Treatment :

(A)

Prophylactic ttt

▪ Measures to Prevent Stasis & Improve Venous Return

- Before Operation :
 - ① Stop Oral Contraceptive Pills.
 - ② Regular Walking.
 - ③ Any heart lesion must be controlled.
- During Operation
 - ① Galvanic stimulation to Calf muscles.
 - ② Pneumatic sleeves.
 - ③ Legs are slightly raised.
- After Operation:
 - ① Early Ambulation.
 - ② Adequate Hydration.
 - ③ Leg Elevation 15-20 degree.
- Prophylactic Anticoagulants for High Risk patients :
- Indications:
 - 1- Obesity
 - 2- Old age
 - 3- previous history of D.V.T
 - 4- After major operation
 - 5- Females on contraceptive pills.

■ Methods:

[1] Low dose Heparin (Mini-heparin):

5000 IU S.C 2 hours before operations & then every 12 hours for 7 days.

[2] Low Molecular weight (LMW) Heparin:

Given once daily & has lower risk of bleeding so more popular.

(B)**Curative ttt****1 Conservative ttt :**

Aim To prevent : Propagated clot, Formation of new thrombi & Detachment or Embolization.

Regimen Leg Elevation 15-20 degree. & Elastic bandage

Anti-coagulants

Heparin I.V or S.C

- **Action** : ↑ Activity of fibrinolysis.
- **Methods of administrations** :
 - ① I.V. (5000 I.U) every 4 hours.
- Or ② I.V infusion of glucose 5% containing heparin at rate of 20-30 I.U/Kg/hour after giving initial dose of 5000 IU.
- Or ③ S.C Heparin (Calciparin) 150 IU/kg every 12 hours.
- **The dose monitored by** [APTT]
Activated Partial Thrombo-plastin Time
- **Antidote**: Protamine Sulphate
- **Complications** : Bleeding from overdose & failure to response
i.e. heparin resistant.

Oral Anticoagulants (Warfarin)

- **Action** : Block synthesis of (prothrombin & factor VII, IX and X).
- **Methods** : 10 mg Initially then 5 mg for 5 days.
- **The dose monitored by** :
Prothrombin Time.
- **Antidote** : Vit. K.
- **Complications** : Bleeding from overdose, interaction with Aspirin, Hypertension & Peptic ulcer.

2 Fibrinolysins :

- **As** Streptokinase, Urokinase and Tissue Plasminogen Activator
- **Complications** : Severe bleeding, Allergic reactions and Very expensive.

3 Surgical : Rare

- **Venous Thrombectomy** with Phlegmasia Cerulac Dolans by Fogarty Venous Catheter.
- **Pulmonary Thrombectomy** with massive pulmonary embolism.
- **I.V.C interruption** to Prevent Recurrent Embolism.

II

Varicose Vein

- ◇ Varicose Vein are Multiple, Dilated, Elongated, Tortuous, Soft, Bluish & Compressible veins of Superficial veins of lower limb.

Anatomical Considerations**Veins of Lower Limb :**

The lower limb is drained by the following venous systems.

I- Superficial system : (Superficial to deep fascia).

It includes ↗

① Greater (Long) saphenous vein :

It begins at the medial end of the dorsal venous arch of the foot and ascends infront of the medial malleolus to the medial aspect of the leg then behind the knee to the inner aspect of the thigh till the saphenous opening (1.5 inch below & lateral to the pubic tubercle) where it arches to join the femoral vein.

▣ Major tributaries of the greater saphenous vein.**A- In the thigh :**

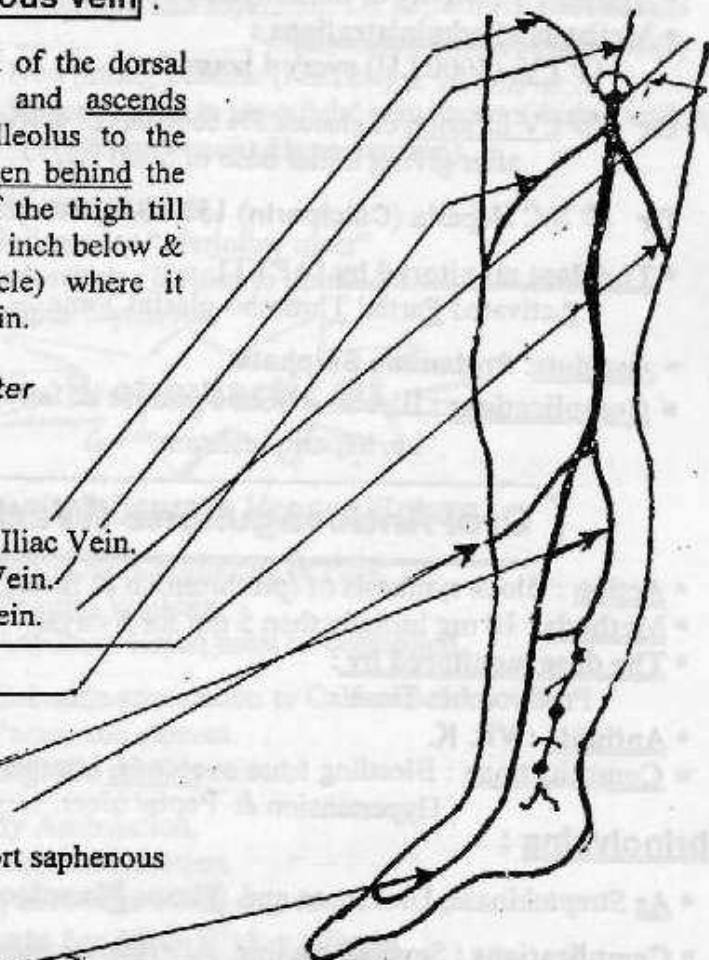
1. Superficial Circumflex Iliac Vein.
2. Superficial Epigastric Vein.
3. Superficial Pudendal Vein.
4. Postero-medial Vein.
5. Antero-lateral Vein.

B- In the leg :

6. Posterior arch vein.
7. Anterior vein of the leg.
8. Tributaries from the short saphenous vein.

C- In the foot :

9. The dorsal venous arch.

**Greater Saphenous System****② Lesser (short) saphenous vein :**

It begins at the lateral end of the dorsal venous arch and ascends below & behind the lateral malleolus to run along the lateral edge of tendo-achilles in the posterior midline of the leg to the middle of the popliteal fossa where it pierces the deep fascia to join the popliteal vein.

II- Deep system: (Deep to the deep fascia)

It includes ➤

① Below the knee:

They consist of venae comitantes of the arteries + the venous sinuses inside the calf muscles (soleus).

② The level of the knee:

They unite to form the popliteal vein which ascends to the thigh to become the femoral vein at the adductor canal the passes deep to the inguinal ligament to change its name into the external iliac vein.

III- The connecting system :

- These veins connect the superficial to deep veins (They have valves which allow a uni-directional blood flow from superficial to deep veins).
- They either ➤

① Direct communicators = Perforators

Directly from superficial to deep veins.

SO The constant perforators of the long saphenous are :

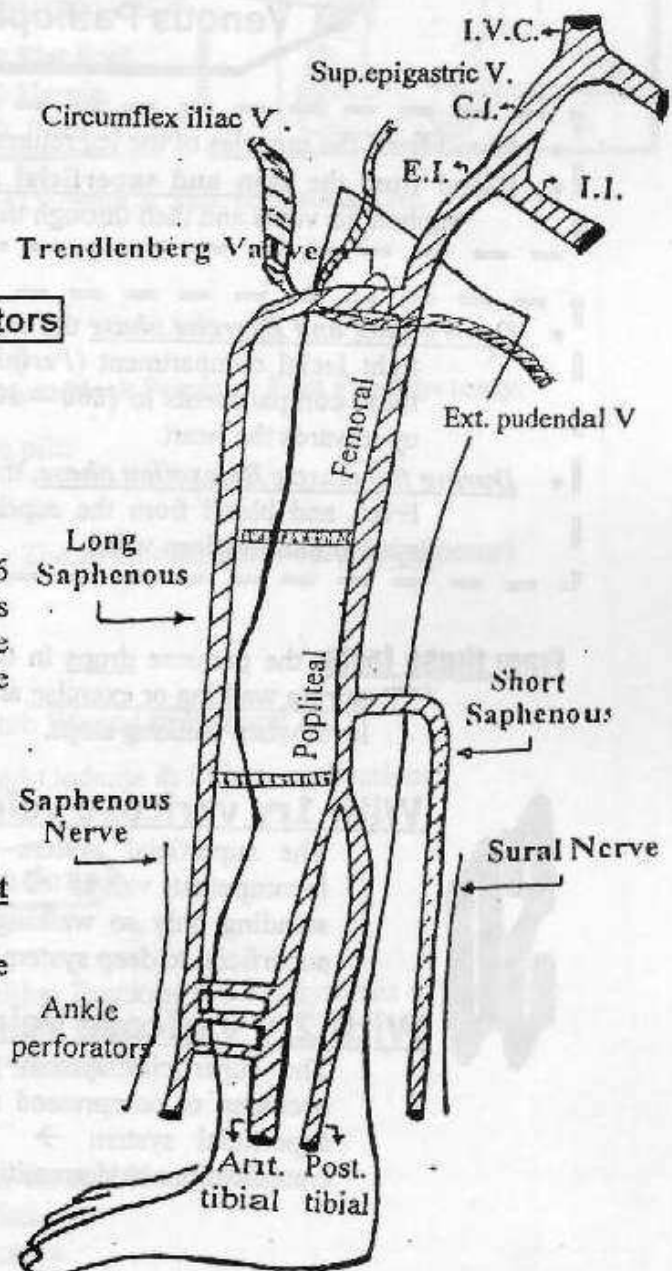
- 3 Ankle Perforators 2, 4 and 6 inches above medial malleolus they drain blood directly from the venous plexus of the skin to the deep system.
- The sapheno-femoral junction.
- 1 perforator just below the knee.
- 1 perforator at the mid thigh.

The perforators of the short saphenous are :

- 1 lateral perforator 5 inches above the lateral malleolus.
- The sapheno popliteal junction.

② Indirect communicators

Veins pass from superficial vein to the muscles & another vein passes from the muscles to the deep veins.



← **Don't forget :**

① All vein are containing valves except at soleus muscle.

② Saphena varix :

- Saccular dilatation at sapheno-femoral junction.
- Saphena = صافى
- Varix = Dilatation.

③ Long Saphenous vein is the longest vein all over the body.

④ Sapheno-femoral junction = Trendlenberge valve.

Venous Pathophysiology

- Blood from the muscles of the leg returns to the deep veins.
- Blood from the skin and superficial tissues drains via the long and short saphenous veins and then through the connecting system to the deep veins.
- On Walking and Exercise phase the calf and thigh muscles contracts within a tight fascial compartment (Peripheral heart) rises the pressure within these compartments to (200 - 300 mmHg) → squeeze the deep veins up towards the heart.
- During the muscle Relaxation phase, the pressure within the calf falls to a low level, and blood from the superficial veins flow through connecting system into the deep veins.

From these facts, the pressure drops in the superficial veins of the lower limb during walking or exercise and returns gradually to the pre-exercise level when walking stops.

So

With 1ry varicose vein :

The superficial system is weak wall or absent valves or incompetent valves → High pressure (heaviness pain) with standing only so walking or Exercise → shift of blood from superficial to deep system. So the pain is decreased

With 2ry varicose vein :

The superficial system is Normal but the deep system is occluded or compressed so during Exercise the blood shift to superficial system → (walking venous hypertension) → complications as dermatitis, ulcers & varicosities

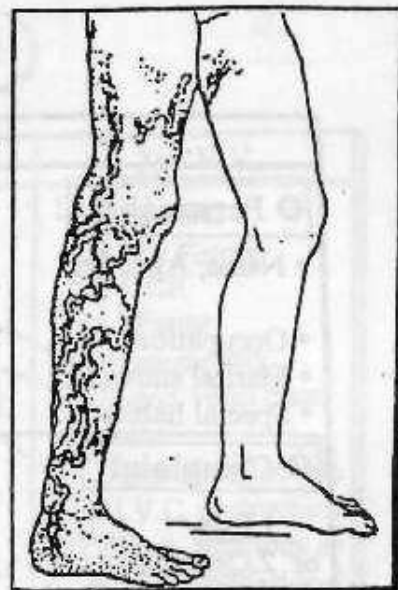
② Aetiology

(1) 1ry VV= non obstructive due to

- Congenital weakness of venous wall.
- Congenital absence or incompetent valves.
 - This is precipitated by :- Prolonged standing or sitting as (surgeons, hair dressers,etc)
 - Due to weak mesenchyme :-

N.B.: Manifestations of weak mesenchyme.

- | | |
|------------------|--------------|
| ① Kyphosis | ② Flat Foot. |
| ③ Visceroptosis. | ④ Hernia. |
| ⑤ Varicocele | ⑥ Piles |



N.B.: 1 ry V.V associated with minimal Oedema & Skin complications.

(2) 2ry VV= obstructive due to

- DVT (deep venous thrombosis) due to
 - 50% Postoperative (old age) as Fracture Neck Femur or Post Prostatectomy.
 - ↑ Risk of DVT as Oral contraceptive pills.
- Deep venous compressio. due to
 - Pelvic or abdominal swellings. (N.B : The Most common swelling is Foetus).
- Arterio-venous fistula. may be
 - Congenital → If Child.
 - Acquired → If Trauma (Bullut or Stab Wound in Femoral Δ).

N.B.: 2ry V.V associated with Marked Oedema & Skin complications.

③ Complications

① Venous Complications :

- 1- Hemorrhage: From minor trauma either Frank or S.C Ecchymosis or Bruises.
- 2- Superficial Thrombophlebitis of dilated veins
- 3- Calcification of thrombosed veins (Phlebolith)

② Skin Complications :

- 1- Brownish pigmentation. due to extra-vasated Haemosidrins.
- 2- Dermatitis From irritant Haemosidrins..
- 3- Ulcer Common with post-phlebitic cases
- 4- Oedema: at 1st pitting but later on non pitting..
- 5- Eczema: Follows scratching of Dermatitis.
- 6- Malignancy: on top of long standing ulcer (Marjolin's ulcer)

④

History

	1ry V.V.	2ry V.V.
⊗ Personal H. • Name, Age, Sex • Occupation. • Marital status. • Special habits	• (commonly) Adult and male or female. • Precipitated factors. • _____ • _____	• (Commonly) Old and may be child. • _____ • Multiple pregnancy. • Tight corset.
⊗ Complaint 1. <u>Pain</u> or 2. <u>Oedema</u> or 3. <u>Skin complications</u>	• At L.L (commonly <u>Bilateral</u>) • Minimal • Minimal	• At LL (commonly <u>Unilateral</u>) • Marked. • Marked.
⊗ Present H. 1. <u>Pain</u> > O.C.D > Severity > Characters > Increased by ↑ > Decreased by ↓ 2. <u>Oedema</u> 3. <u>Skin complications</u> 4. <u>Associated swellings</u> 5. <u>Investigations & ttt</u>	(Commonly <u>bilateral</u>) • O.C.D. • Mild • <u>Heaviness</u> pain ± burning localized pain due to superficial thrombophlebitis. • ↑ with prolonged standing or sitting. • ↓ by <u>Walking</u> . • <u>Mild</u> & Appear at evening then resolute after sleep. • + <u>Minimal</u> • Groin : e.g (Saphena varix) • Abdomen or pelvis : -ve • Usually -ve • <u>No</u> History suggest DVT • DM & hypertension etc.... • Congenital mesenchymal wall	(Commonly <u>Unilateral</u>) • O.C.D. • Severe • <u>Bursting</u> pain due to D.V.T. • ↑ with prolonged standing or sitting or by walking. • ↓ by <u>Elevation</u> of the affected limb. • <u>Marked</u> & persist not related to time. • <u>Marked</u>  Brownish pigment Dermatitis. Ulcer • Groin : e.g (L.Ns) • Abdomen or pelvis : <u>mass</u> . • Usually +ve • Factors suggest ↑ DVT (see before) • Pelvic or abdominal mass e.g. compression on <u>GIT</u> . • Trauma (A/V fistula) • Bullut. • Stab wound • DM & hypertension etc.....
⊗ Past H.		
⊗ Family H.		

⑤ General Examination

	1ry V.V.	2ry V.V.
☆ We look For →	☆ <u>Manifestation of weak mesenchymic</u> 1) Kyphosis 2) Visceroptosis 3) Hernia 4) Lt. varicocele 5) Flat foot & halux valgus	1) <u>Vital signs</u> If A/V. Fistula • ↑ HR • Murmur 2) Organomegaly. 3) Dilated veins cross groin. 4) Bilateral varicocele if I.V.C. obstruction 5) Tallipes equinus as ulcer complications.

⑥ Local Examination



- ☆ Proper Position = Standing patient.
- ☆ Proper Exposure = from Umbilicus to toes.
- ☆ Don't forget : • Examination of both limb.
 • Examination of back as well as front & side.
 • General examination part of local examination.

Inspection	1ry V.V.	2ry V.V.
	"Multiple, Bluish, Tortuous, Visible Swellings"	
1) <u>Side</u>	• Usually (<u>bilateral</u>)	• Usually (<u>Unilateral</u>) Except I.V.C. obstruction.
2) <u>Site</u>	• Along course of veins, (long or short saphenous or both). • <u>Never</u> crosses the groin	• Along any vein or venule. • V.V. <u>crosses</u> the groin
3) <u>Shape</u>	• Tubular. • Saccular  	• Serpentin. • Spider.  
4) <u>Skin over</u>	• <u>Minimal</u> complications.	• <u>Marked</u> • Pigmentation. • Ulcer
5) <u>Swollen limb (oedema)</u>	• <u>Minimal</u>	• <u>Marked</u>
6) <u>Skeletal deformity</u>	• Flat foot or hallux valgus.	• Tallipes equinus.
* <u>Look for (Inguinal region)</u>	• Saphena varix. • Hernia.	• L.Ns.

edge → well define
 ill define
 Comparison to other side

Palpation**[A] While pt. Standing : (7)**

1. Palpate V.V. for soft, compressible.
2. Palpate V.V. for tender nodule (along the course) for thrombosis.
3. Palpate V.V. for tender cord (for superficial thrombophlebitis).
4. * If 2ry V.V. look for $\Rightarrow$ Direction of blood of dilated veins across inguinal region.
5. Thrill if A.V. fistula.
6. Expansile impulse on cough at Sapheno-femoral junction.
7. Saphena varix : [If 1ry V.V.]
 - * Saccular dilatation show expansile impulse on cough" at sapheno-femoral junction.

[B] While pt. Lying Down : (7)

1. Skin : For (ulcer)
2. S.C. tissue : For (oedema). $\begin{cases} 1ry \rightarrow \text{pitting.} \\ 2ry \rightarrow \text{non pitting} \end{cases}$
3. Muscle : For (Tone & Tender calf muscle)
 - > Homan's Test (not done)
4. Bone : For (Periostitis of tibia)
5. Vein : If defect in deep fascia.
6. Artery : Arterial pulsation as dorsalis pedis artery.
7. L.Ns : Inguinal L.Ns.

Percussion**Schwartz percussion**

- The vein is percussed by index of one hand & palpate distally by fingers of other hand.
- If the valves are incompetent = The wave is transmitted distally. $\rightarrow$

Auscultation

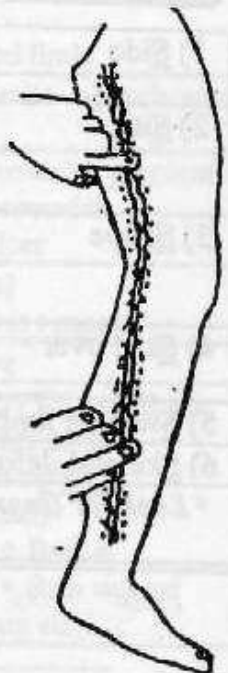
If A/V. fistulla = Continuous machinery murmur.

Special Test**(A) Test to detect (Blow out = Incompetent perforators) :**

- ① Trendelenberg Test
- ② Multiple Tournique Test.
- ③ Manual Localization Test.
- ④ Fegan's Test.

(B) Test to Differentiate between occluded & patent deep veins :

- ① Perthe's Test.
- ② Modified Perthe's Test.

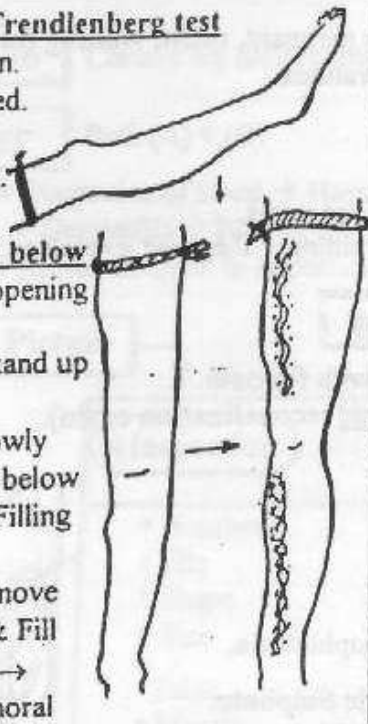


Special test :-

(A) Test to detect (blow out) = Incompetent perforator

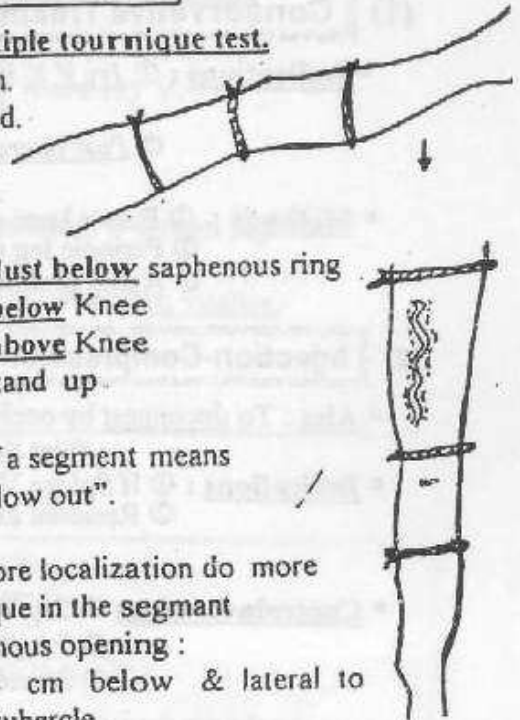
① Trendelenberg test

- ① pt. lies down.
 - ② His leg raised.
 - ③ massage to empty veins.
 - ④ Tournique applied just below saphenous opening
 - ⑤ Ask pt, to stand up
- ⇒ Results
- Normal slowly Filling from below
 - ⇒ If rapid Filling → blow out
 - ⇒ If we remove Tournique & Fill from above → sapheno-femoral incompetent



② Multiple tournique test.

- ① pt. lies down.
 - ② His leg raised.
 - ③ massage to empty veins
 - ④ Tournique applied
- Just below saphenous ring
below Knee
above Knee
- ⑤ Ask pt, to stand up.
- ⇒ Results
Rapid filling of a segment means that there is "blow out".
- N.B
- ① For more localization do more Tournique in the segment
 - ② Saphenous opening :
→ 4 cm below & lateral to pubic tubercle.



③ Manual localization Test "Two finger Test"

- ☆ Pt, stand and The two index are pressed at a point on great saphenous vein → then empty at opposite direction.
- ☆ Results → If vein fill between two fingers → blow out.

④ Fegan's test

- ☆ 1st Pt, stand & Then mark the varicositis.
- ☆ 2nd Pt, lies down & detect the defect of deep fascia (i.e blow out) then mark by (x).



(B) Test to differentiate between occluded & patent deep vein

- ① Perthe's Test (not done) : depend on pain.
 - ② Modified perthe's test : ☆ pt, stand & tournique applied below saphenous opening.
"Ochsner's test" ☆ Ask pt, to walk insitue for (10 min).
- Results → 1- If engorge (prominent) → occluded deep system.
2- If shrunk → patent deep system.

⑦

Investigations

▪ Venography :

- To shows
- ① Patency & Size of deep veins.
 - ② Presence of valves or Blow out.

▪ Doppler U/S

▪ Arteriography for A/V. fistula.

▪ Abdominal & Pelvic sonar.

⑧

Treatment**(1) Conservative Treatment**

- **Indications** : ① 1ry V.V. if early, patient is pregnant, unfit, waiting for.
Or Refusing operations.
- ② Post-operative V.V.

- **Methods** : ① Below knee elastic stocking.
- ② Periodic leg elevation to prevent stasis.
- ③ Avoid prolonged standing & sitting + Regular exercises.

(2) Injection-Compression Sclerotherapy

- **Aim** : To decongest by occlusion of lumen with fibrosis
(Not thrombosis to avoid reconalization again).
- **Indications** : ① If Spider Varicosities.
- ② Residual after operations.

- **Contraindications** ① 2ry V.V with DVT.
- ② Pregnancy.
- ③ Acute Septic Thrombophlebitis.

- **Sclerosing Materials** : ① 3% Na Tetradecyle Sulphate.
- ② 5% Ethanolamine Oleate.
- ③ 5% Na Morrhuate.

- **Technique** : ● Empty of segment of blood.
Then isolated by 2 fingers. Then injection
Then Firm elastic bandage is applied for 6 weeks.



- **Precautions**: ① Small dose (1mL).
- ② One is done only then others at other visits.
- ③ Walking & Exercises are advised

(3) Operative Treatment

- **Indications** ① Saphena Varix.
- ② Blow out.
- ③ Repeated superficial thrombophlebitis.

▪ Operations**① Trendlenbarg's operation:**

- **Indicated** : with sapheno-Femoral incompetence i.e saphena varix.
- **Principle**: ligation of long saphenous & it's tributaries.

② Subcutaneous stripping of long saphenous:

- **Indicated** : if whole system is severely affected
- **Principle**: Trendlenbarg's operation then S.C stripping of whole long saphenous vein.

③ Subfascial Tripple ligation of Incompetent perforators:

- **Indicated**: with Incompetent perforators.
- **Principle**: 3 ligature are applied on perforator & long saphenous vein then Inverting "T" Segment is removed

Don't Forget Venous (Varicose) Ulcer

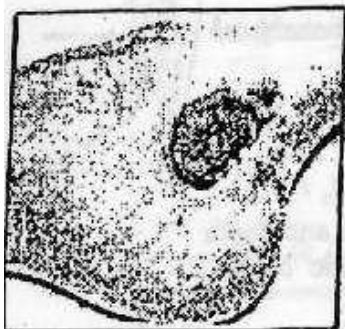
⊛ **Definition** Chronic leg ulcer complicating 2ry V.V (Rare 1ry V.V)

⊛ **Aetiology** Both (A) + (B)

(A) = Stagnation of blood → Haemolysis → ↑ Haemosiderins → Brown pigment.
+ Dermatitis → Itching → Ulcer.

(B) = Reflux of blood to superficial veins → Anoxia → ↓ Skin vitality.

⊛ **Clinical Picture**



☆ Inspection

- | | |
|--------------------|--|
| • Number | • Usually single. |
| • Site | • <u>Leg</u> (gaitre area). |
| • Shape | • Oval (usually). |
| • Size | • Variable (in Cm x Cm). |
| • Edge | • <u>Sloping</u> edge or punched out edge. |
| • Margin | • Brownish pigment. |
| • Floor | • <u>Unhealthy</u> or healthy granulation tissue |
| • <u>Discharge</u> | • Pus (purulent discharge) |

☆ Palpation

- | | |
|-------------------|---|
| ① Temp. | • At body temp. |
| ② Tenderness | • (<u>Not</u>) Except if infected or post-phlebitic limb. |
| ③ Skin around | • Thick, brown & varicosities. |
| ④ Base | • (<u>hard</u> if chronic) |
| A ⑤ Artery | • <u>Normal</u> pulsation. |
| V ⑥ Vein | • Oedema.
• If <u>1ry V.V.</u> → pitting
• If <u>2ry V.V.</u> → Non pitting |
| L ⑦ L.Ns | • <u>Not</u> enlarged except (infected). |
| N ⑧ Nerve | • Intact sensation. |

⊛ Complications

① **Malignancy** : Marjolin ulcer which is Raised Everted Edge, Hard & Fixed Base with Hard L.Ns.

② Periosteitis.

③ Talipes Equinus.

⊙ Investigation

- ☆ Lab., (blood, urine, stool)
- ☆ Aspiration Biopsy Cytology (A.B.C)
- ☆ Biopsy (must include the edge)
- ☆ Specific to the cause. e.g. X-ray to exclude periosteitis

⊙ Treatment

(A) Conservative ttt :- AS (V.V) + [Daily Dressing & Systemic AB]

(B) Surgical ttt :

① Covering ulcer by :

- (a) Thiersch graft
- or (b) Cross Leg Flap.

N.B. : (Debridement must be done 1st).



② Sub-fascial ligation of perforator (Cockett & Dodd operation)

- By passing from muscles to perforate deep fascia
- Through postero-medial incision behind Tibia.
- Complicated with ugly scar & high rate of recurrence.



③ Treatment of complications :

- Malignancy : Excision with safety margin 1cm of surface and depth with plastic reconstruction and Prophylactic block dissection of L.Ns.
- Periosteitis : Saucerization.
- Talipes Equinus : Physiotherapy.

III

Superficial Thrombophlebitis

* Definition : Thrombosis of inflamed superficial veins.

* Aetiology : ① Systemic : Polycythaemia, SLE. and Ulcerative colitis.
 ② Local : V.V, Trauma, Burger's disease & venous cut down.

* Types : ① Sterile type.
 ② Bacterial type.

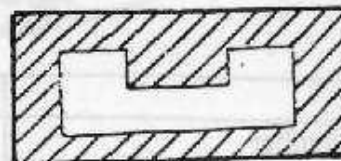
* C/P : ① Symptoms : Pain + Fever, Headache, Malaise and Anorexia.
 ② Signs : Tender Cord like structure With overlying skin redness

* Treatment : ① Plastic Bandage.
 ② Analgesics & A. B if bacterial type.

N.B. : Thrombophlebitis Migrans : (Trousseau sign)
 Due to ↑ blood viscosity with Internal carcinoma
 as stomach & pancreas.

Chronic Leg Ulcers

"Discontinuity of The Skin"



Classification

- ☆ **Congenital** → (Sickle cell Anaemia)
→ (Congenital Spherocytosis)
- ☆ **Traumatic** → (Bed sore or Trauma)
(i.e History of Trauma)
- ☆ **Inflammatory** → T.B ulcer (Night sweat & fever + loss of weight & appetit).
→ \$ ulcer [Skin Rashes + F.H.M.A.]
- ☆ **Neoplastic** → Marjoline ulcer
- ⑤ ☆ **Venous** → Venous ulcer.
(i.e History of associated V.V)
- ④ ☆ **Arterial** → Ischaemic ulcer.
(i.e History of Claudication pain)
- ③ ☆ **Lymphatic** → Lymphoedema ulcer
- ② ☆ **Nervous** → Neurotrophic ulcer as ♂ neuritis.

N.B. Chronic Foot Ulcers

- Traumatic, Neoplastic, Ischaemic, Lymphatic and Neurotrophic

①

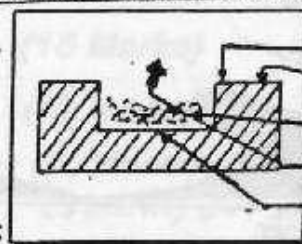
Congenital Ulcer

e.g. Sickle Cell Anaemia & Congenital Spherocytosis
[The site : Middle 2/4 of Tibia]

②

Traumatic Ulcer

Wounds, Burns, Radiation & Bed sore	
• <u>Number</u> • <u>Site</u> • <u>Shape</u> • <u>Size</u> • <u>Edge</u> • <u>Margin</u> • <u>Floor</u> • <u>Discharge</u> ☆ <u>Base</u>	• Single • <u>Middle 2/4 of Tibia</u> • Variable. • Variable • <u>Punched out</u> But if healed <u>sloping</u> • ± pigmentation. • Granulation tissues - <u>Healthy</u> if Healed. - <u>Unhealthy</u> if Recent • Serous or purulent • Indurated at Margin



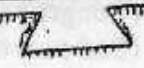
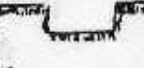
Edge
Margin.
Floor.
Discharge.
☆ Base

N.B. : Treatment :

- Rest & Elevation of leg.
- Dressings & A.B.
- Grafting if needed.

③

Inflammatory Ulcer

	T.B.	S
• <u>Number</u>	• Single	• Single or Multiple
• <u>Site</u>	• <u>Metaphysis of Tibia</u>	• <u>Middle 2/4 of Tibia</u>
• <u>Shape</u>	• Variable	• Variable
• <u>Size</u>	• Variable	• Variable
• <u>Edge</u>	• <u>Undermined</u> 	• <u>Punched out</u> 
• <u>Margin</u>	• <u>Cyanotic</u>	• Skin Rashes.
• <u>Floor</u>	• <u>Caseous Material</u>	• Granulation Tissues.
• <u>Discharge</u>	• Serous	• Ooze pus & blood.
☆ <u>Base</u>	• Soft	• Indurated at margin

④

Malignant Ulcer

(3 Types)

- Marijoline ulcer on Top of venous
 - ① Raised Everted Edge. 
 - ② Hard & Fixed Base.
 - ③ Hard L.Ns.
- 1ry Skin Tumor e.g. Melanoma
- Ulcerating Deep Malignancy e.g. Osteosarcoma

⑤

Venous (Varicose) Ulcer

- * Healthy granulation tissue : Painless, pink, not ooze or blood easily.
- * Unhealthy granulation tissue : Painful, yellow, ooze or blood easily.

⑥

Arterial (Ischaemic) Ulcer

Ischaemic Ulcer	Varicose Ulcer
	
* Deep Ulcer. * Affect Foot. * [Ischaemic Disease]. * Ischaemic Manifestations. * No Leg swelling i.e No oedema. * ↓Pain by foot dependency	* Superficial Ulcer * Affect (Above Med. Maleolus). * Post-phlebitic syndrome. * V.V Manifestations. * Leg swelling i.e. oedema. * ↓Pain by Foot elevation

⑦

Neurotrophic Ulcer

- * **Definition** : Occur at area deprived from it's nerve supply
- * **Cause** : Peripheral Neuropathy as D.M.
- * **Mechanism** : The foot is anaesthetized & the patient is unaware of trauma → ulcer.
- * **Clinical Pictures** : • **Site** : Sole of foot.
• **Size** : Variable.
• **Margin** : Corns & Callosities.
- * **Treatment** : ① **Conservative** : Rest, Elevation & Dressing.
② **Excision** of callosities.
③ **Amputation** if destroyed bone i.e osteomyelitis

⑧

Lymphoedema Ulcer

- **Commonest site** At dorsum of foot.
- **Due to** rupture infected bulla.
- **Associated with** ① Papillary projections. ② Lymphorrhoea. ③ Swollen limb oedema.

**Final Written Exams**

- | | | | |
|------|---|------------|----------|
| 1993 | • DD of Chronic Leg ulcer | (10 Marks) | |
| 1994 | • Discuss Deep Venous Thrombosis (D.V.T.) | (25 Marks) | پور ٹائی |
| 1996 | • Discuss C/P of (D.V.T) in the L.L veins | (10 Marks) | پور ٹائی |
| 1997 | • (D.V.T) : Causes, C/P & Management | (15 Marks) | پور ٹائی |
| 1998 | • Discuss predisposing factors and prevention of (DVT) | (15 Marks) | |
| | • Discuss C/P & treatment of (D.V.T.) | (10 Marks) | دور ٹائی |
| 2001 | • Mention path., C/P of (D.V.T.) | (10 Marks) | |
| 2002 | • Discuss deep venous thrombosis (D.V.T.) | 20-Marks) | دور ٹائی |
| 2003 | • Describe the Anatomy of long saphenous vein | (12 Mark) | پور ٹائی |
| | • Mention Aetiology & diagnosis of D.V.T. | (12 Mark) | پور ٹائی |
| | • Discuss C/P & DD of varicose ulcer | (12 Mark) | پور ٹائی |

Chapter [13]

Lymphatic Diseases

Lymphatic Disorders

I Diseases of Lymphatic Vessels

Lymphoedema

* Definition :

Lymphoedema is a hypertrophic condition of skin and S.C Tissues caused by chronic lymphatic obstruction.

* Site :

S.C Tissues of Limbs, Breast, Scrotum & Vulva.

* Aetiology : It may be ➤

(A) Congenital (1ry Type) : Rare

- Congenital Aplasia or Hypoplasia.
- It may be Familial (Milroy's Disease)
- It may be Manifested
 - At birth ➔ Congenita.
 - At puberty ➔ Precox.
 - At adult ➔ Tarda.

(B) Acquired (2ry Type) : Common

- Traumatic : ① Circumfrential skin loss of the limbs.e.g Burn
② Extensive block dissection of L.Ns during the operations.
- Inflammatory : ① Filariasis (পদাৰ্থ)
② Chronic specific lymphangitis, e.g. T.B.
- Neoplastic : ① Metastasis occluding the nodes.
② Lymphoma but rare.

* Pathology :

Lymphoedema ➔ lymph stasis ➔ Recurrent lymphangitis (Streptococcal), each attack obliterate more lymphatics ➔ 4 stages ➤

- ① Stage of soft pitting oedema
- ② Stage of lymphorrhoea Due to rupture of lymphatic vesicles which leads to discharge of their lymph.
- ③ Stage of fibrosis (Non-pitting oedema) : Extravasated fluid with its high protein content excites fibrosis of skin and subcutaneous tissues.
- ④ Stage of Warty Pseudo-papillomatous formation : i.e. Elephantiasis.
The skin is roughened, puckered and non pitting like elephant skin.

* Complications :

It may be ➤

- Recurrent Cellulitis and Lymphangitis (The most frequent).
- Lymphoedema ulcers from ruptured and infected blebs.
- Huge and Heavy limb
- Lymphangiosarcoma (very rare).

* D.D :

[Causes of Swollen limb]

Bilateral i.e. Generalized oedema

- Renal oedema. ▪ Cushing syndrome
- Cardiac oedema. ▪ Myxoedema
- Hepatic oedema.
- Allergic oedema.

Unilateral i.e. Localized oedema

- Venous oedema (low protein content).
- Lymphatic oedema (high protein content).
- Congenital A.V fistula (local gigantism).
- Neurofibromatosis Elephantiasis.

* Clinical Picture :

Filarial lymphoedema

- Age : Adult or Elderly.
- Residence : [Endemic Area] for filariasis.
e.g. Rasheed, Damietta, Giza, Imbaba & Sharkaya.
- Symptoms: ① Progressive Leg Swelling with exacerbation and partial remission from recurrent lymphangitis.
② Elephantoid Fever
③ In late Cases : Dark, Thick skin with Callosities i.e. Elephantiasis.
- Signs : ① Oedema
(Ranges from pitting to non pitting According to it's stage)

N.B. : No oedema in the following sites :

- Sole : Because of planter apponeurosis.
- Crease : Because it drains directly to the Ankle joint, i.e deep lymphatics.

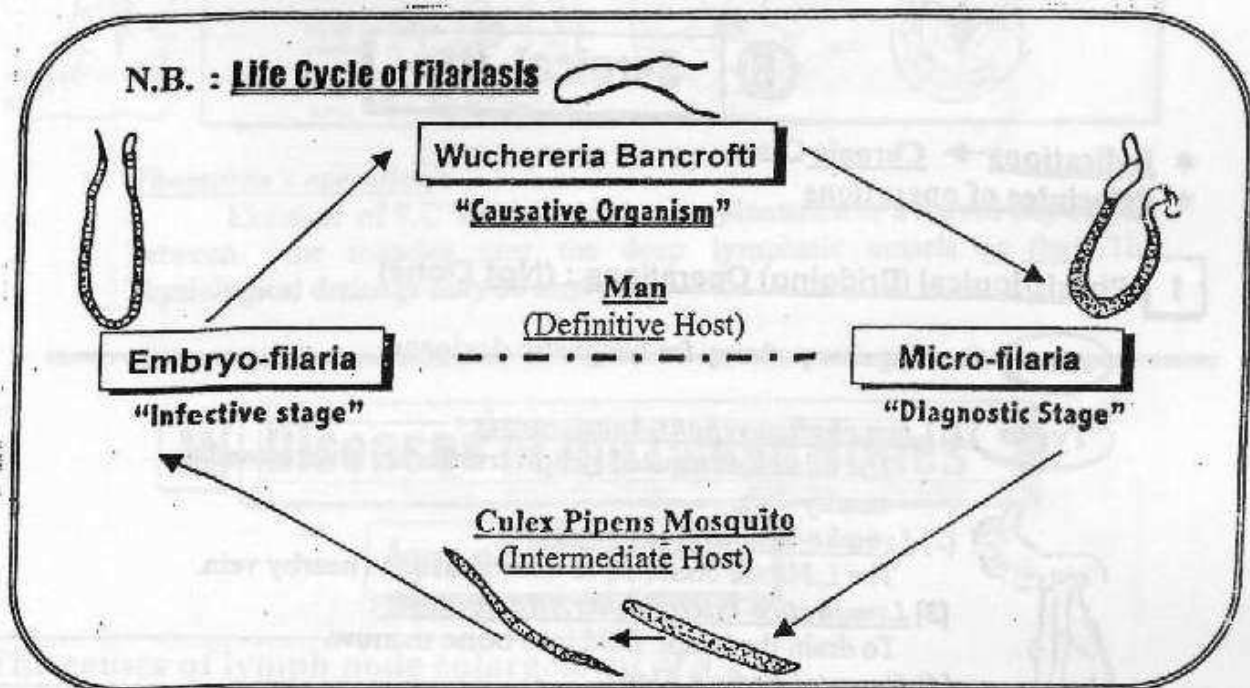
② Inguinal L.Ns may be Enlarged, Firm & Tender or may form soft lobulated mass

③ Other Filarial Manifestations

- (a) Scrotum : Lymphadema → Mechanical impotence (*sunken penis*)
- (b) Spermatic Cord & Epididymis :
Funiculo-Epididymitis.
- (c) Tunica Vaginalis : 2ry Hydrocele i.e Chylocele

*** Clinical Classification of Lymphoedema (Bruner) :**

Grade	Clinical features
Latent	Excess interstitial fluid and histological abnormalities of lymphatics but <u>no</u> clinical lymphodema.
I	Oedema <u>pits</u> on pressure and swelling disappears on elevation and bed rest.
II	Oedema <u>does not pit</u> and <u>not</u> reduced on elevation.
III	Oedema is associated with irreversible skin changes, fibrosis, papillae (elephantiasis).



*** Investigations :**

① **Lymphangography** (Not done Nowadays).

By injecting ultra-fluid lipidol in lymphatics on the dorsum of foot.

- It shows the state of lymphatic vessels.
- It asses Extent of L.Ns affection in tumors.

② **Investigations of [Filariasis]**

- Complete Blood Picture shows High Eosinophilia.
- Night Film shows Micro-filaria.
- Serological Tests : e.g. Intradermal Test.

N.B. : Inguinal L.Ns biopsy shows Dead fibrial Worms + Calcifications or malignant depositions.

③ **Lymphocintigraphy** : Scanning of lymphatic vessels & Nodes using radioactive TC^{99} labelled colloidal particle.

④ **CT scan** : To exclude pelvi-abdominal mass.

⑤ **MRI** : Provides image of lymphatic vessels & Nodes.

* **Treatment :****(A)****Conservative ttt*** **Indications** → **Early** Cases only* **Regimen** : ① Rest & Elevation of foot.

② Massage & Elastic stocking.

③ Diuretics & Antibiotics, e.g. penicillin 1,200,000 units/3 weeks

④ **Antifilarial** Drugs

Hetrazan 50 mg t.d.s for 3 weeks.

(B)**Surgical ttt*** **Indications** → **Chronic** Cases.* **Principles of operations****I** **Physiological (Bridging) Operations : (Not Done)****Aim** Creating new pathway for lymphatic drainage.**Types** [1] **Lymphatico-venous Anastomosis :**

The dilated obstructed lymph trunks are anastomosed to nearby vein.

[2] **Lympho-venous Anastomosis :**

The L.Ns are bisected & anastomosed to nearby vein.

[3] **Lymphatico-interosseous Anastomosis :**

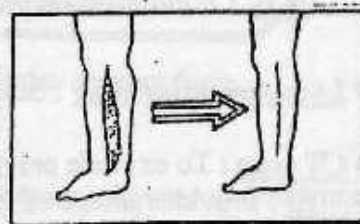
To drain the lymph fluid into bone marrow.

← [4] **Omental Pedicle Flap :**

Laid in the thigh muscles to develop new lymphatics by the omentum.

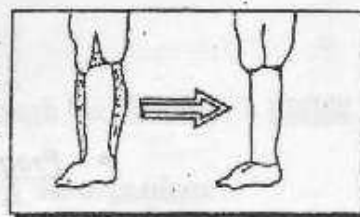
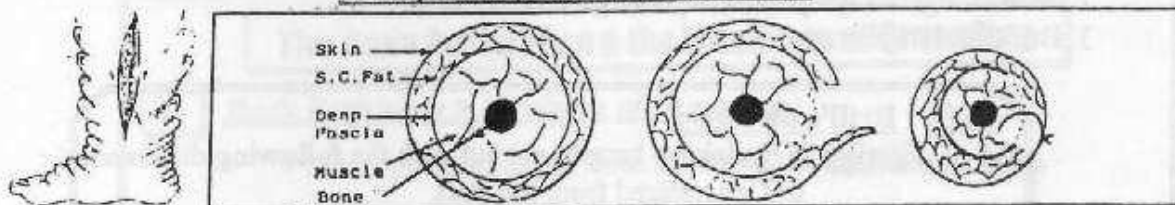
[5] **Kondoleon's Operations :**

A long strip of deep fascia is removed, with the idea that the Skin & S.C Tissues will be drained into deep lymphatics.

**Disadvantage** They leave the thick subcutaneous tissues, i.e. bad cosmetic.**II** **Excisional Operations : (Mostly Done)****Aim** Removing the thick S.C Tissues for Cosmetic & Functional reasons..**Types** [1] **Sistrunk Operation :**A long strip of deep fascia & thick S.C tissues are excised allowing the skin to adhere to the muscles and acquire new lymph drainage, but high rate of recurrency.

[2] Charle's (Flaying) Operation →

Skin, S.C Tissue & Deep fascia are removed (flaying) then Covered by Thiersch graft leads to ↓ Recurrence.

III Physiological & Excisional Operation :Thompson's (Swiss roll) operationThompson's operation :

Excision of S.C Tissues and then implantation of a shaved flap of skin between the muscles near the deep lymphatic vessels so that. The physiological drainage may be improved.

II **Diseases of the Lymph Nodes****Lymphadenopathy**

The causes of lymph node enlargement are

① Inflammatory :

a. Acute non specific.

- Septic lymphadenitis.
- Infectious mononucleosis.

b. Chronic :• Non specific.

- Child with tonsillitis or pharyngitis.
- Scalp infection.
- Pediculosis capitis.

• Specific :

- Bacterial A- T.B. (See later)

B- \$ - 1ry \$ (chancre + L.Ns).

- 2ry \$ (skin rashes + mucous patches + generalized lymphadenopathy.

- 3ry \$ (gumma) very rare L.Ns.

- Parasitic : Filarial (See before)

- Viral : A. Lymphogranuloma inguinal :

- It is a venereal disease, carry from person to another by contact.
- Few weeks from contact, papule appears near the genitalia with inguinal LNs.

B. Cat scratch disease :

- o Unknown but may be history of cat scratch with lymphadenopathy 1-2 weeks later.

C. AIDS.

- Protozoal : Toxoplasma.

② Lymphomas :

1. Hodgkin's lymphoma.
 2. Non Hodgkin's lymphoma.
 3. Burkitt's lymphoma.
- (See later)

N.B. : Brill's disease :

Similar to Hodgkin's lymphoma but with the following differences :

- ① Generalized from the start.
- ② Early extra-nodal affection.

③ Blood diseases :

1. Acute leukaemia.
2. Chronic myeloid leukaemia.
3. Chronic lymphatic leukaemia.

④ Lipoidosis.

⑤ Metastases.

⑥ Collagen disease.

①

Tuberculous Lymphadenitis

Incidence

- Age : Children & Young adult.
- Residence : Bad hygienic areas.

Types

Ⓐ Lymph Borne 1ry Type

- Fibrocaseous type.
- Localized L.Ns
- Affect the cortex of L.Ns

Ⓑ Blood Borne 2ry Type

- Lymphadenoid type.
- Generalized L.Ns.
- Affect the Medulla of L.Ns

Ⓐ Lymph Borne (Fibrocaseous) 1ry Type

*** Aetiology :**

- Source of Infection : Infected Milk.
- Organism : Mycobacterium Tuberculosis (Bovine type).
- Route of Infection : Lymphatic vessels.

* Pathology :

- T.B ingested with infected milk then filtered through the Tonsils → cortex of upper deep cervical L.Ns.
- The Body reacts by sending macrophages to engulf the organism.
- End result will depend on —————→

The Body Resistance & the Virulence of Organism

I Body Resistance > Virulence of Organism :

- Macrophages phagocytose the bacilli → Epithelioid Cells.

II Body Resistance = Virulence of Organism :

- Rare & Affect adult.
- Fibrosis (No Caseation) occur.

III Body Resistance < Virulence of Organism :

- Common & Affect children.
- The Macrophages fail to abort the lesion so they fuse together → Langhans Giant Cells surround the lesion, further cells like (lymphocytes, plasma cells & Fibroblasts) will surround the lesion as outer manner to form finally → Tubercle Follicle
- Within 2 weeks
Necrosis (Caseation) occur in the center due to
 - ① Hypersensitivity to bacilli toxins.
 - ② Ischaemia i.e. Cellular proliferation without Vascular proliferation

* Clinical Picture :

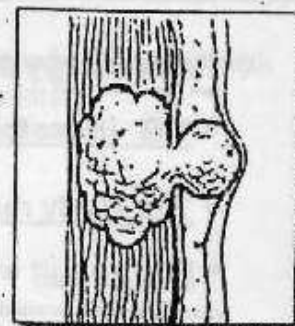
- No T.B Toxaemia
- Localized lymphadenopathy
 - Site, Upper Deep Cervical L.Ns.
 - Consistency : Firm, Cystic (Abscess) or Hard (Calcification).
 - Characters : Painless, Matted (Adherent to each other) i.e. Peradenitis or Rosary Beads due to associated thick lymphangitis.



▪ Pictures of Complications

- ① Cold Abscess : Due to Caseation.
(It is Actually not cold & not abscess).
 - ★ Not Cold → Because it is clinically warm.
 - ★ Not Abscess → Because [The content is caseous material not pus].
- ② Calcification : It becomes hard mass.
- ③ 2ry Infection.

- ④ Rupture through deep fascia i.e. S.C abscess
So called **Collar Studd Abscess**
- ⑤ Rupture through skin
T.B Sinus → 
- ⑥ Local spread to adjacent L.Ns.



* Investigations :

▪ Laboratory :

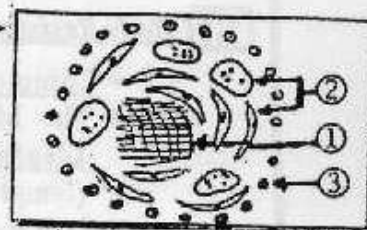
- Blood Picture (Anaemia, Leucopenia & Relative lymphocytosis).
- Tuberculin Test : Serves as good -ve Test.
- Aspiration of Cold Abscess for Bacteriology
 - Ziehl-Nelson's stain → Will demonstrate tubercle bacilli which is (acid fast, Alcohol fast) in 72% of cases.
 - Culture on Lowenstein Media → for 6 weeks in 98% of cases.
 - Guinea Pig Inoculation → 94%

▪ Radiological :

- X-ray for Chest & Mediastinum.

▪ Surgical : (L.N biopsy) → **Tubercle follicle**

- ① Central Zone: Caseation with Tubercle bacilli.
- ② Midzone : Epithelioid cells + Langhans giant cells.
- ③ Peripheral Zone : Small rounded cell as (Lymphocytes, plasma cells & fibroblasts).



* Treatment :

(A) General ttt

- [1] Sanatorium (6-9) months.
- [2] Dietetic rich in vitamins : e.g. Vit. D.
- [3] Therapeutic : (Anti-tuberculous drugs)

1st 3 months (Streptomycin) 1gm IM day after day then (At least 2 drugs) →

- | | |
|--------------------------|----------------------------|
| ① INH 5 mg/KBW | ③ Ethambutal 15 mg/KBW |
| ② Rifampicine 10 mg/KBW. | ④ Pyrinzimanide 20 mg/KBW. |

(B) Local ttt

- Surgical Excision of L.Ns : If localized group of L.Ns persist inspite of medical ttt.
- ttt of Cold Abscess :

- Repeated aspiration with injection of Streptomycin.

- Technique : ① Healthy skin & Aseptic technique.
- ② In Non dependant area & wide bore needle.
- ③ In a Valvular manner.

- Stop Aspiration when blood comes out.

- Incision & Drainage If 2ry infected.

- Excision of Underlying L.N If resist and to treatment.

▪ ttt of T.B sinus :

- Repeated dressing with Streptomycin Powder.
- Excision of Underlying L.N If resists to treatment.



Blood Borne (Lymphadenoid)

2ry Type

* Pathology :

- T.B. reach the L.N through the artery at hilum → Medulla is affected & L.Ns show hyperplasia and not caseation.
- There is No Periadenitis, No Matting, No Caseation, No Cold abscess, No Calcification & No Sinus.

* Clinical Picture :

- T.B Toxaemia (متسم)
 - "Night Sweat, Night Fever, Loss of weight & Loss of appetit"
- Generalized Lymphadenopathy
 - Site: Start as one group at Cervical group of L.Ns then becomes generalized.
 - Consistency : Firm.
 - Characters : Painless, Discrete, Mobile & uniform in size



* Investigations : "As Before"

But L.Ns biopsy show Hyperplasia.

* Treatment :

- General !!! : As before
- Local !!! : No Role of surgery except for L.N biopsy.

② Lymphomas

Definition

- 1ry Malignant Neoplasm of Reticulo-endothelial System (RES).

Types

- The Main Types are: I – Hodgkin's Lymphoma.
II – Non-Hodgkin's Lymphoma.
III- Burkitt's Lymphoma.



Hodgkin's Lymphoma "Lymphadenoma"

* Incidence : The Commonest Type of Lymphoma.

- * Site : Whenever there is lymphoid tissues, Hodgkin's Disease may occur
i.e. L.N, Thymus, Spleen, Liver, Bone marrow, Payer's patches etc...

N.B. : Hodgkin Disease may be primarily

- Nodal (Common) : Starts in lower deep cervical L.Ns then becomes generalized.
- Extra-nodal (Rare) : In late cases e.g. Liver, Spleen etc..

* Pathology :

- **N.E Picture:** • The L.Ns are replaced by **Pinkish Neoplasm** which doesn't infiltrate the surroundings except very late.
 - Very late cases there are deposits in Spleen, Liver, Bone marrow & Lungs.
- **Microscopic picture : [Pleomorphism]**
 - Reticulum cells (Histiocytes), Lymphocytes, Plasma cells, Neutrophils & Eosinophils.
 - **Reed Sternberg Cells** are pathognomonic giant cells which is multinucleated 2-8 nuclei arranged in mirror images → 

* Classification : "Histological Types"

- **Lymphocyte Predominant Type :** The Best prognosis.
- **Nodular Sclerosis Type :** The Cell nodules surrounded by fibrosis.
- **Mixed Cellularity Type .**
- **Lymphocyte Depleted Type :** The Worst prognosis

* Clinical Picture :

- **Age :** Commonly with Young or Adult.
- **Sex :** Male > Female.
- **Nodal Picture** • **Site :** Start as one group (lower deep cervical L.Ns) then becomes generalized.
 - **Consistency :** Firm (**Rubbery**).
 - **Characters :** Painless, **Discrete**, Mobile & **Different** in size → 
- **Extra-nodal Picture :**
 - **Systemic :**
 - Night sweat, Loss of weight, Pruritis, Anaemia.
 - **Pel-Ebstein Fever** (Characteristic Fever) which is 2 weeks of fever alternating with 2 weeks freedom.
 - **Alcoholics** → ↑ Pain at site of Hodgkin's disease.
 - **Local :** i.e. **Pressure symptoms**

Abdominal Manifestations

- ★ Slight Splenomegaly.
- ★ Liver Enlargement & Jaundice.
- ★ **Ascities** from Hepatic dysfunctions.
- ★ I.V.C & Ureteric compression by Para-aortic L.Ns.

Chest Manifestations.

- ★ Dyspnea, Cough & Chest pain i.e Mediastinal Syndrome. -

Skeletal Manifestations

- ★ Bone aches ± Vertebral Collapse.

Neurological Manifestations

- ★ Peripheral Neuropathy ± Spinal Cord Compression.

* Staging : [Ann Arbor Staging System]

- Stage I : One group only of L.Ns.
★ (Stage I^E) if Single Extra-nodal organ affection.
- Stage II : More than one group of L.Ns at same side of diaphragm.
★ (Stage II^E) if More than one Extra-nodal affection at same side of diaphragm.
- Stage III : L.Ns are involved Above & Below Diaphragm.
- Stage IV : Extra-nodal spread as Liver, Spleen, B.M etc...

N.B. : Each stage is further Subdivided into ∅

"A" → No Systemic symptoms.

"B" → One or more of systemic symptoms as Fever Night sweat, Pruritis, Anaemia etc.

* Investigations :

▪ Laboratory

- Blood picture : ↑ ESR + (Anaemia, Oesinophilia or Lymphopenia).
- Liver function Tests : ↑ Alkaline Phosphatase with liver involvement.

▪ Radiological :

- Chest (X-ray & CT scan).
- Abdominal (U/S & CT scan).

▪ Bone Marrow Puncture.

- Staging Laparotomy : • Indicated with Stage I (A&B) & Stage II A.
• Includes ∅

- Splenectomy : For staging & Avoids the need of its irradiation.
- Biopsy of both liver lobes.
- Biopsy of all intra-abdominal lymph node groups, which are marked by (Metal Clips) to help future localization by the radiotherapist.
- Bone Marrow Biopsy from the Iliac crest.

N.B. : Staging laparotomy is not preferred in many Centres
Because of ↑ Accuracy of CT scan & MRI.

* Treatment : "Depending on Staging"

- Stage I (A&B) & stage IIA : Treated by Radiotherapy alone
- Stage II B : 6 cycles chemotherapy (MOPP) supplemented by Radiotherapy.
- Stage III & IV : 12 cycles chemotherapy (MOPP) supplemented by Radiotherapy.

N.B. : ① MOPP : Mustin (IV), Onchovine (IV), Procanbazine (ORAL) & Prednisone (ORAL)

② Role of surgery :

- a. Splenectomy if hypersplenism.
- b. Decompression of ureter of IVC by LNs.
- c. In young female, ovaries are sutured retro-uterine to be away from radiotherapy.

* Prognosis : "Relatively Good Prognosis"

(5 years survival rate of 80% of patients with proper treatment)



Non-Hodgkin's Lymphoma (NHL)

* Incidence : Rare Type of Lymphoma.

But common with the following diseases ↗

- ① Sjogren's Disease.
- ② Systemic Lupus Erythromatosus (S.L.E).
- ③ Immuno-suppression after organ Transplantation.
- ④ AIDS

* Site :

- Nodal : Starts in the Cervical group of L.Ns then becomes generalized.
- Extra-nodal : e.g. Liver, Spleen, Bone marrow, Skin "Mycosis Fungoides" & GIT mucosa So may leads to ↗

Gastric Lymphoma

Which produce manifestations similar to Carcinoma.

Intestinal Lymphoma

Which may produce intestinal obstruction, bleeding or even perforation.

* Pathology :

- N.E Picture: ① The L.Ns are replaced by White Neoplasm which infiltrate the surrounding tissues.
- ② Similar deposits are formed in Liver, Spleen, Bone marrow & Lungs.
- Microscopic picture : "The normal architecture of nodes are lost"
 - ① The Architecture is replaced by Sarcomatous cells, Lymphocytes & Reticulum cells.
 - ② The Lymphocytes being predominant in Lymphosarcoma & Reticulum Cells being predominant in Reticulum Cell Sarcoma. & both of them being predominant in Lymphoma Mixed Cell type.

* Classification : "Based on Cell of origin"

- B-Cell Lymphoma : • Small Cell Lymphoma,
• Large Cell Lymphoma,
• Mixed Cell Lymphoma
• Immunoblastic Lymphoma.
- T-Cell Lymphoma.
- Lymphoblastic Lymphoma.
- Histiocytic Lymphoma.

* Clinical Picture :

- Age : Commonly with Elderly.
- Sex : Male > Female.

- **Nodal Picture** • **Site** : Start as one group (Cervical group of L.Ns) then becomes generalized.
- **Consistency**: Firm, Soft (if Degenerated) or Hard (if calcified)
- **Characters** : Painless, **Amalgamated** → i.e. Can't be counted.
- **Extra-nodal Picture** : As Hodgkin's i.e. Infiltration.



* **Staging** : —————→ As Hodgkin's Lymphoma.

* **Investigations** :

* **Treatment** :

- **Radiotherapy & Chemotherapy** according to stage as Hodgkin's lymphoma.
- **Surgical ttt** : • *Indicated with* Gastric & Intestinal Lymphoma.
- *Technique By* Gastric & Intestinal **Resection**.

* **Prognosis** : "Very Bad"



Burkitt's Lymphoma

- * **Incidence** : The Rarest Type of Lymphosarcoma
- * **Aetiology** : Unknown. But may be related to infection with **Ebstein Barr (EB)** virus which cause I.M.N in healthy people & Burkitt's Lymphoma in patient with Chronic Malaria.
- * **Clinical Picture** : [Common < 12 years & In Western Africa]

The usual presentation is painless, progressively enlarged jaw swelling. It may also affect the Kidneys, Ovaries, Long bone & Central Nervous System.

* **Pathology** : (Starry sky) appearance = pale retinaculum with dark lymphocytes.

* **Treatment** : Chemotherapy (N.B. : Nodal Affection is very rare.)



Final Written Exams



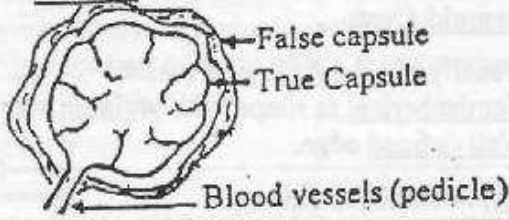
- (1994) • Discuss the Pathology, C/P & ttt of Hodgkin's Lymphoma. (25 Marks) نور ثانی
- (1998) • Discuss Aetiology & pathology of chronic lymphatic obstruction (15 Marks)
- (2000) • Discuss Aetiology & pathology of chronic lymphatic obstruction (15 Marks) نور ثانی
- (2001) • Discuss C/P & Treatment of T.B. lymphadenitis (10 Marks)
- (2003) • Enumerate the causes of lymphoedema (9 Marks) نور ثانی

Chapter [14]

Skin, S.C Tissues, Bursae, Tendons & Fascia

Skin, S.G Tissues, Bursae, Tendons & Fascia

I Disease of Skin & S.G Tissues

	[1] LIPOMA	[2] SEBACEOUS CYST
I- Definition	★ <u>Benign tumor</u> of adipose ★ <u>It may be:</u> 1- Pure lipoma (Commonest). 2- Fibrolipoma i.e. Contain excess F.T 3- Haemangiolipoma = Naevolipoma 4- Myxolipoma i.e. contain Myxomatous Tissue .	★ <u>Retention cyst</u> ★ <u>It is caused by:</u> (obstruction of the duct of sebaceous cyst) by 1. Inspissated sebum 2. Dirts.
II- Pathology	★ Yellowish <u>lobulated</u> aggregations of <u>fat cells</u>  False capsule True Capsule Blood vessels (pedicle)	★ <u>Epidermoid cyst</u> : 1- Stratified squamous epithelium. 2- <u>Sebum</u> with bad odour. 3- Blocked by black dot called (<u>Punctum</u>).
III- Site	① <u>Sub-cutaneous</u>: (Back) commonest. ② <u>Sub-fascial</u>: Deep to deep fascia. ③ <u>Sub-periosteal</u>: i.e. flat bone. ④ <u>Sub-synovial</u> i.e. osteoporosis of knee. ⑤ <u>Sub-mucous</u>: e.g. larynx or intestine. ⑥ <u>Sub-serous</u>: i.e. Retroperitoneal. ⑦ <u>Intermuscular</u> → simulate abscess. ⑧ <u>Intramuscular</u> → D.D Fibrosarcoma. ⑨ <u>Extradural</u> (spinal) → Paraplegia (rare). ⑩ <u>Intra glandular</u> : e.g. Breast. ★ <u>Never</u> in Brain, Eye lid, penis	<u>Hairy area</u> (Back). [Face – Scalp Trunk – Scrotum etc. ...]
IV- Complications	① <u>Compression</u> manifestations. ② <u>Retroperitoneal</u> type → • Myxomatous Degenerations. • Sarcomatous Transformations. ③ <u>Calcifications</u> especially in. • Axilla & groin. • Buttocks.	★ <u>Never</u> in Palm or Sole ① <u>Infection</u> & suppurations ② <u>Local Alopecia</u>. ③ <u>Cock's Tumor</u>: ulcerated Infected scalp with raised edge and <u>No</u> Indurated base. ④ <u>Sebaceous Horn</u> Successive layer of dried inspissated Sebum.
V-Treatment	• <u>IF Solitary</u>: Excision under local anaesthesia i.e. <u>Enucleation</u> by elliptical incision. • <u>IF Multiple</u>: Removal of the most complicating one. • <u>IF Huge in size</u>: As above + use <u>drain</u>	• <u>IF Uncomplicated</u>: Excision with local anaesthesia. • <u>IF Complicated</u>: Incision drainage then Excision. • <u>IF Multiple at scrotum</u> Excision of part of scrotum.

(13) Dermoid cyst

* Definition:

It is a Cyst lined by Stratified Squamous Epithelium.

* Types:

① Sequestration Dermoid Cyst

- It is a Congenital inclusion of a piece of epithelium in the S.C. Tissue at line of fusion of the body during the foetal Life
- The Commonest sites:
 - ① Face: External & Internal Angular Dermoid.
 - ② Neck & Trunk: Middle line (Ant. & post.)
 - ③ Ear: Pre & Post-auricular Dermoid.

N.B: Dermoid Cyst Never appears in upper & Lower Limbs because they appears as Buds & not by fusion.

▪ Examination of Dermoid Cyst:

- (A) Inspection:
 - ① Usually Single, At line of fusion.
 - ② Hemispherical in shape with variable size.
 - ③ Well defined edge.
- (B) Palpation:
 - ① Not Attached to skin
 - ② Lax & Cystic in consistency.
 - ③ Bony depression due to constant pressure



② Tubulo-dermoid

- ★ Due to distension of Remnants of Embryonic ducts as Thyroglossal cyst & Embryonic cyst as Branchial Cyst.

③ Teratomatous Dermoid

- ★ It is a Benign Teratoma contains Teeth, Hair, Bone, Cartilage etc & It occurs mainly in Ovary & Testis.

④ Inclusion Dermoid

- ★ It is due to inclusion of epidermis during closure of a cavity as Supra-sternal region.

⑤ Implantation Dermoid

- ★ It occurs 2ry to puncture of wounds which displace some epithelial cells into S.C. Tissue → Cyst formation. It occurs mainly in the Fingers, Palm & Sole.



* Treatment: All Cases are treated by Excision

N.B: In children with sequestered dermoid in the scalp. It is better to wait until closure of skull-sutures because some cysts may communicate with the dura.

[4] **Haemangioma**

[A] **Capillary**

[B] **Arterial**

[C] **Venous**

It is not a true tumor, but tumor like i.e. Hamartoma
 Hamartoma = Congenital Malformation or Error of vessels

[A] **Capillary Haemangioma**

① **Strawberry Naevus**

- It is also called "**Haemangioma Simplex**".
- Site: The commonest site is Face.
- Colour: Bright red.
- Surface: Slightly Raised above the surface.
- Course: Present shortly after birth [1-3 weeks] then after one year it starts to undergo involution.
- Treatment: Not required because of it's spontaneous involution



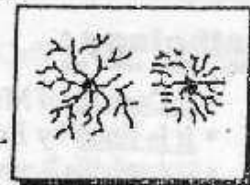
② **Portwine Stain**

- It is also called "**Naevus Flammeus**".
- Site: Along the distribution of cutaneous nerve frequently trigeminal nerve of the face and never crosses the middle line.
- Colour: Dark Purple.
- Surface: Usually Flat.
- Course: Present Since Birth & Doesn't undergo involution.
- Treatment: LASER Application is the choice. Excision & grafting is very difficult as it may involve a large area of the face.



③ **Spider Naevi**

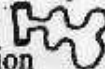
- It occurs with patients having L.C.F. or Portal Hypertension.
- It is due to Hyperoestrogenaemia or unknown cause.
- It consists of multiple dilated arterioles at the distribution of S.V.C.



[B] **Arterial Haemangioma** "Cirroid Aneurysm"

- It is a dilated Tortuous arterioles occurring mostly in the scalp "Temporal & occipital" regions.
- It appears as Soft Compressible & Pulsating mass with Marked bruit over it.
- The treatment: ① Pre-operative Embolisation by Gel foam
 Then ② Ligation of feeding vessels.
 Then ③ Excision of Aneurysm.

ICI Venous Haemangioma "Cavernous Haemangioma"

- It is a Spongy Network of dilated veins like a cavity. It is connected to the systemic circulation → 
- Examination : ① *Since birth* with no involution
② *Reddish swelling of mucus membrane* of lips & Tongue. It may involve internal organs as liver.
③ *Soft, Compressible* but Non Pulsating mass.

N.B.: It is complicated by Severe bleeding due to mild trauma or Septicemia due to 2ry infections.

- Treatment : ① *LASER Therapy*
Or ② *Injection* of sclerosing material.
Or ③ *Surgical Excision*.

I5I Lymphangioma

IAI Capillary lymphangioma

IBI Cavernous Lymphangioma

It is not a true tumor, but tumor like i.e. Hamartoma
Hamartoma = Congenital Malformation or Error of vessels

IAI Capillary lymphangioma

- ★ They are Small, Soft brownish papules formed by Dilated Lymph Capillary

IBI Cavernous Lymphangioma "Cystic Hygroma"

* Definition :

It is a sac formed from sequestered part of jugular lymph sac of foetus.

* Pathology :

- It Consists of Multiple Intercommunicating Cystic Lymph Space.
- It is lined by Endothelium.
- It contains Lymph.

* Clinical picture :

- Age : Since Birth or Shortly after.
- Site : ① Common at lower part of side of neck superficial to Sterno-mastoid & extends to post. Triangle.
② The next common site is Axilla alone or with Neck.
③ The less common Cheek, Lip (Macrocheilia) and Tongue (Macroglossia).
- Characters : Irregular shape, large in size, Ill defined edge, Translucent, Lax, Cystic & Compressible, but Non pulsating mass.



*** Treatment :**

- ① Excision as early as possible
 or ② Injection of boiling water of sclerosing material / weekly → Fibrosis.
 or ③ IF infected give A.B. → Fibrosis.

[6] Neurofibroma

It is a congenital Disease affecting Nerves.

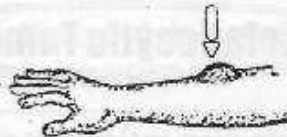
The tumor arises from Fibrous neurolemmal sheath.

[A] Generalized Neurofibromatosis "Von Reckling-hausen's Disease"

- It is Multiple Tumors of the body along the course of cranial & spinal nerves.
- It is diagnosed by
 - ① Painless swelling.
 - ② Fusiform in Shape, Firm in consistency and Mobile across but not along the course of nerve.
 - ③ Associated with brown pigments "Café au lait" patches
- Treatment : Removal only of tumors causing pain or pressure effect.

[B] Solitary Neurofibroma

- ★ As Generalized but single.

**[C] Acoustic Neuroma**

- ★ Neurofibroma arising from acoustic nerve leading to Deafness & cerebellar symptoms. It may be single or part of generalized type.

[D] Molluscum Fibrosum

- ★ It is a neurofibroma arising from the Termination of cutaneous nerves. It affects any part of the skin except the Palms & Soles.

[E] Elephantiasis Neruomatosa

- ★ It is Elephantiasis of the limb + Mechanical block of the joint + "Café au lait" patches.

[F] Plexiform Neuroma "Pachydermatocle"

- ★ It affect S.C nerve plexuses leading to thickening of the nerves & Redundant thickened skin

N.B. :

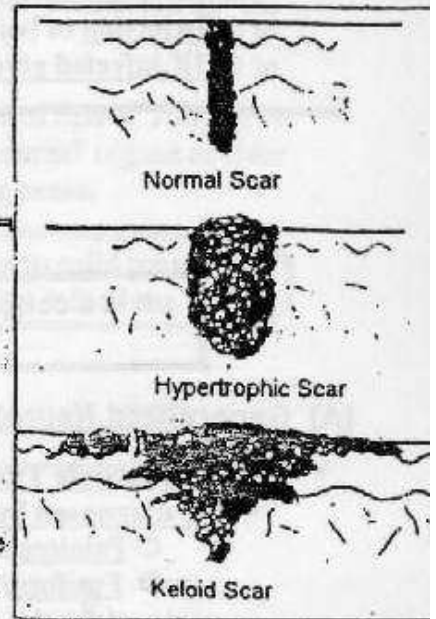
Hamartoma	True benign tumour
• Dating since birth. • Not capsulated. • Stop growth at the age of puberty or when mother tissues stop growth.	• Never congenital. • Usually have a true capsule. • Never stop growth spontaneously.

17) Hypertrophic Scars

- **Definition** : It is an excessive amount of fibrous tissue Confined to scar
- **Aetiology** : It occurs if Extra-stimulus to fibrous tissue formation during healing such as infection or Excessive tension.
- **Treatment** : Excision + Plastic repair.

18) Keloid

- **Definition** : It is a localized over growth of the fibrous tissues extends beyond the original wound into normal tissues.
- **Aetiology** : It occurs after Wounds, Burns or Surgical operations.
- **Treatment** : It is Difficult because of high rate of recurrence.
 - ① Pre and post-operative Irradiation to ↓ recurrence.
 - ② Excision.
 - ③ Intra-lesional steroid injections → Give Excellent Result.



19) Melanocytic Tumors

From Melanocytic cells (Melanin pigment) present at Basal layer of Epidermis

▪ Types :

- ① **Lentigo**:
 - The Melanocytes replace the basal layer of epidermis in certain sites.
 - Clinically : It appears as flat Black or Brown spots.
 - ② **Junctional Naveus** :
 - More proliferation of Melanocytes → Small Nodules of epidermis and bulge downwards in the Dermis.
 - Clinically: Like Lentigo
 - ③ **Compound Naveus** :
 - Present in both Epidermis & Dermis.
 - Clinically: It appears as Raised Brown to Black nodule.
 - ④ **Intra-dermal Naveus**:
 - Present mainly in Dermis
 - Clinically Like Compound Naveus.
- Can Pigmented naevi undergo malignancy?
Yes, if present at site of chronic irritation.
 - Indications for surgical Excision? .
 - ① Cosmetic reasons.
 - ② IF Subjected to repeated irritation as (Face).
 - ③ IF Malignant transformation is suspected.

Premalignant Conditions of the Skin

[1] Actinic (senile) (solar) keratosis :

- The commonest precancerous lesion of skin.
- It is due to prolonged exposure to sun as farmers and fishermen
- Pathology :
 - Site : multiple lesions on the face and backs of hand.
 - N/E : usually the lesions < 1cm and have dry, Hard scales
 - M/P : Abnormal epithelial cells limited to epidermis
- Treatment :
 - ① If single : a. Superficial lesion → Freezing with liquid nitrogen.
b. Horny lesion → diathermy curettage.
c. Indurated lesion → Excision.
 - ② If Multiple :
Chemotherapy (5 fluoro-uracil) & No radiotherapy.

[2] Chronic Radiodermatitis :

- Area of skin damaged by Excessive exposure to irradiation.
- Early : Erythema or ulceration but later on irregular hyperpigmentation & Hair loss. Eventually → squamous cell carcinoma.

[3] Xeroderma pigmentosa : (Rare disease of children)

The condition starts by Hyperpigmentation followed by Atrophy and thinning of the skin.

[4] Leukoplakia : e.g. lip.

[5] Carcinogens : e.g. Tar derivatives.

[6] Lupus vulgaris (T.B. of skin).

[7] Chronic ulcer (Marjoline ulcers).

e.g chronic venous ulcer, untreated burn.

[8] Seborrhoeic keratosis.

[9] Bowen's disease :

- It is a potentially malignant disease (seen with Elderly).
- It is due to Arsenic ingestion e.g. medically taken or due to viral cause.
- Usually red, flat, scaly or crusted mistaken with solar keratosis
- Investigation : biopsy may be needed.
- Treatment :
 - ① Destructive therapy by Cryotherapy, Curettage or Cauterization.
 - ② Chemotherapy may be needed if small lesion.
 - ③ Surgical Excision if large lesion.

Tumor Like Conditions of the Skin

[1] Wart

* **Aetiology**: Localized epithelial proliferation due to viral infection.

* **Clinical picture**:

- Small horny projection that is usually multiple & grayish.
- Common in the dorsum of the hands & feet.
- Only the plantar warts are painful.

* **Treatment**:

- ① Surgical excision with diathermy.
- ② Cryosurgery by freezing the wart using liquid nitrogen.

N.B.: Condylomata acuminata are giant warts transmitted by sexual contact.

[2] Callosity :

* **Aetiology**: Localized thickening of the skin due to repeated friction & pressure.

* **Clinical picture**:

Area of thickened skin which they are painless, yellowish plaques elevated above the surface.

* **Treatment**: (Removal of the cause) +

Shaving with sterile Razor & application of keratolytic agent e.g. salicylic acid.

[3] Corn :

* **Aetiology**: Neglected callosity with downgrowth of hard horny plug pressing on sensory nerve endings.

* **Clinical picture**:

Circumscribed conical mass with depression in the center which is very tender.

* **Treatment**: Like callosity but excision is usually needed.

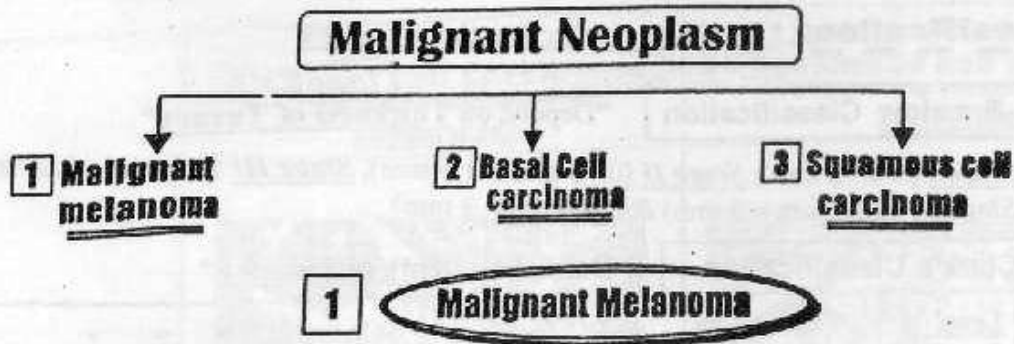
[4] Keratoacanthoma : (Molluscum Sebaceum)

* **Aetiology**: It was thought that it is a true tumour, but its progressive then regressive course raises the suspicion of its inflammatory nature.

* **Clinical picture**:

- It is common on the face of middle aged people.
- It forms a red firm rounded papule that enlarges rapidly to about 2 cm in one week then regresses slowly to heal within 3 to 6 months. There is a keratin plug in the center.

* **Treatment**: Excisional biopsy.



*** Incidence :**

- Age : 30-60 years
- Sex : Male > Female
- Commoner in Western countries due to ☞ defective Ozone layer.

*** Predisposing Factors :**

- Prolonged exposure to Ultraviolet rays.
- Albinism & Xeroderma pigmentosa.
- On top of Benign naevus (Chronic Irritation).

N.B. Criteria of Malignant Transformation of benign Naevus are ☞

- ① Increased in Size or thickness.
- ② Increased in Pigmentation.
- ③ It becomes Painful & Indurated.
- ④ Hard Enlarged Draining L.Ns.
- ⑤ Surrounded by Multiple Satellite Nodules.
- ⑥ Ulceration & Bleeding.

*** Pathology & Clinical Types :**

	① Superficial spreading Melanoma	② Nodular Melanoma	③ Lentigo Melanoma	④ Acral lentiginous melanoma	⑤ Amelanotic melanoma
▪ Incidence	64%	12-25%	1-15%	Rare	Rare
▪ Age	Middle	Young	Elderly	-----	-----
▪ Site	Any part of the body	Any part of the body	Usually of <u>Face</u>	In the palm & sole	---
▪ N/E	The lesion is raised above surface with irregular edge	The lesion is nodular, dark in color & very liable to ulcerate	The lesion is begins as a flat brown macule with slowly growth	-----	-----
▪ M/P	Spindle cells, Epitheloid cells & Polymorphocellular cells.				
▪ Prognosis		Bad	Good	Poor	V. poor

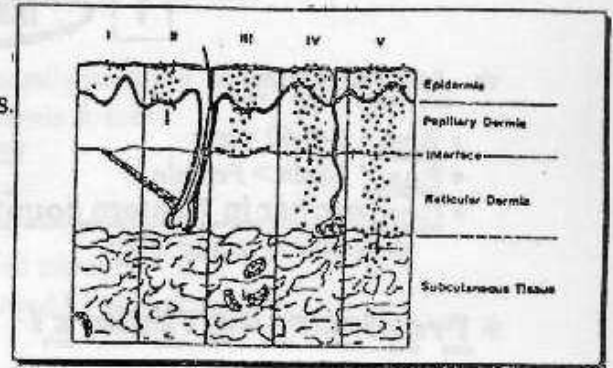
*** Classifications : i.e. Factors affecting the prognosis**

(A) Breslow Classification "Depend on Thickness of Tumor"

Stage I (< 0.75 mm), Stage II (0.75 mm – 1.5 mm), Stage III (1.5 mm – 2.25 mm)
Stage IV (2.25 mm – 3 mm) & Stage V (> 3 mm)

(B) Clark's Classification "Depend on Depth of Invasion"

- Level I : Epidermal.
- Level II : Dermo-epidermal Junction.
- Level III : Superficial papillary Dermis.
- Level IV : Deep papillary Dermis.
- Level V : Subcutaneous Tissue.



*** Spread :**

- Direct spread : To surrounding tissues
- Lymphatic spread : By Both $\Rightarrow$ Permeation (i.e. Satellites) and Embolization .
- Blood spread : very rare. Dry deposits are usually Black

*** Clinical picture : ★ See pathological Types .**

*** D. D. :**

- ① Pigmented Basal Cell Carcinoma.
- ② Granuloma or Haemangioma.
- ③ Compound or Junctional Naevus.

*** Investigations :**

The Only Sure Methods are Biopsy & Histological Examination.

*** Treatment : (Radio-resistant)**

[A] The 1ry lesion : Should be excised with safety margin 2-3 cm together with subcutaneous tissue.

N.B. The Deep Fascia Never excised

[B] The L.Ns : IF Not Clinically involved $\Rightarrow$

Fine Needle Aspiration is done to ensure that they are free

But IF Clinically involved $\Rightarrow$

Radical Block dissection must be done.

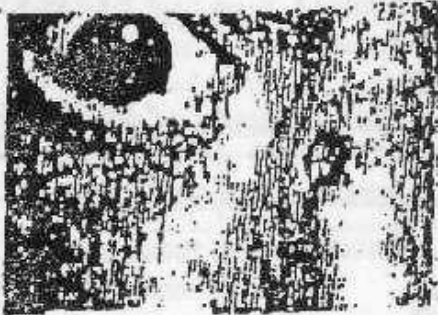
[C] The Metastasis :

Treated by Chemotherapy, Interferons and by Interleukin-2 .

*** Prognosis :**

According to Pathological Types

- Nodular Melanoma : Bad prognosis.
- Lentigo Melanoma : Good prognosis.
- Acral Lentiginous Melanoma : Poor prognosis.
- Amelanotic Melanoma : Very poor prognosis.

	2 Basal cell Carcinoma Rodent ulcer	3 Squamous cell carcinoma Epithelioma
		
* Definition :	<u>Locally</u> Malignant tumor arises from the <u>Basal</u> Layer of skin	<u>Malignant</u> Tumor arises from Stratified <u>Squamous</u> Epithelium of the skin
* Incidence : • <u>Age</u> • <u>Sex</u> • <u>Race</u>	"Common" • > 40 years • Male > female • White > Black	"Less common" • > 50 years • Male > Female • White > Black
* Predisposing Factors :	① <u>Prolonged</u> Exposure to Sun rays i.e. Ultraviolet Rays. ② Albinism. ③ Xeroderma Pigmentosa	① <u>Prolonged</u> Exposure to Sun rays i.e. Ultraviolet Rays. ② Albinism. ③ Xeroderma Pigmentosa. ④ <u>Previous Irradiation</u> . ⑤ <u>Long standing irritation</u> as Chronic ulcer, Sinus or Burn scar. ⑥ <u>Carcinogens</u> as Tar derivatives.
* Pathology : • <u>Site</u>	♦ <u>90%</u> in the Face especially above a line from lobule of ear to the angle of mouth. ♦ <u>Other sites</u> as Dorsum of hand & Perianal regions.	♦ <u>Upper part of Face</u> , scalp Lip, Gums & Tongue. ♦ <u>Other sites</u> as Dorsum of hand, Oesophagus & Anal canal
• <u>N/E</u>		
• <u>N°</u> • <u>Site</u> • <u>Shape</u> • <u>Size</u>	• Usually <u>single</u> • <u>As</u> above • Oval or rounded • Usually <u>small</u>	• Usually <u>single</u> • <u>As</u> above • Irregular in shape. • Usually <u>large</u> because of rapid rate of growth.

	2 Basal cell Carcinoma Rodent ulcer	3 Squamous cell carcinoma Eplthelloma
• Edge • Margin • Floor • Discharge ★ Base	• <u>Rolled in</u> & Beaded • Dilated capillaries. • Covered by <u>Crusts</u>. • Blood & pus	• <u>Raised everted</u>. • ——— • <u>Necrotic</u> • Blood & pus.
★ <u>M/P</u>	★ Indurate but <u>not</u> beyond the edge. ① <u>Peripheral columnar cells</u> arranged in palisad manner. ② <u>Central Polyhedral cells</u> with basophilic nuclei. ③ <u>No</u> Tendency for keratinization	★ Indurated & <u>Fixed</u> to the underlying tissue ① Epithelia pearls or <u>Cell nests</u> ② <u>Mass of malignant</u> epithelial cells. ③ <u>Central keratin</u>
★ <u>Spread</u> :	① <u>Direct Spread</u>: The <u>only</u> spread to surroundings and the underlying structures. ② <u>No Lymphatic spread</u>: But if enlarged L. Ns. it is due to 2ry Infections or Epitheliomatous transformation ③ <u>No</u> Blood spread.	① <u>Direct Spread</u>: The tumor is rapidly infiltrates the adjacent structures. ② <u>Lymphatic Spread</u>: By Embolization to the regional L.N.s. which is hard & stony in consistency. ③ <u>Blood spread</u>: Late & rare.
★ <u>Types</u> :	• <u>Nodular Form</u>: The lesion starts as a small nodule which ulcerate later. • <u>Ulcer Form</u>. • <u>Excavating Type</u>: The ulcer erodes deep into the underlying structures leading to destruction of the nose. N.B. other types as Pigmented, Flat superficial spreading types (Field - fire type)	
★ <u>Clinical Picture</u> :	① <u>Patient represents</u> by a small nodule which later on ulcerate. ② <u>No</u> Draining L.Ns ③ <u>Examine ulcer</u> "As before"	① <u>Patient represents</u> by an ulcer which grows rapidly. ② <u>Hard</u> draining L. Ns ③ <u>Examine ulcer</u> "As before"

	2 Basal cell Carcinoma Rodent ulcer	3 Squamous cell carcinoma Epithelioma
* Complications : -----	① <u>2ry infections</u> → Meningitis & Cavernous Sinus Thrombosis i.e. cause of death. ② <u>Severe Hemorrhage</u> from Erosion of big vessels. ③ <u>Epitheliomatous</u> Transformation	METASTASIS
* D.O :	① Squamous cell carcinoma ② Malignant melanoma. ③ Kerato-acanthoma.	① Basal cell carcinoma ② Malignant melanoma. ③ Kerato-acanthoma.
* Investigations -----	① <u>Lab</u> (Blood, Urine, Stool). ② <u>Aspiration Biopsy Cytology</u> (A.B.C) ③ <u>Biopsy</u> (must include the edge). <u>N.B: Specific</u> as X-ray skull	① <u>Lab.</u> (Blood, Urine, Stool). ② <u>Aspiration Biopsy Cytology</u> (A.B.C) ③ <u>Biopsy</u> (must include the edge). <u>N.B: Specific</u> as X-ray skull
* Treatment :	★ <u>Irradiation:</u> > <u>Indicated in</u> : Old patient with large lesion. > <u>Contraindicated</u> : (see indications of surgical tt). ★ <u>Surgical Excision:</u> > <u>Indicated in:</u> 1- Very small 2- Ulcer <u>near</u> the eye. 3- <u>Recurrence</u> after irradiation. 4- <u>Resistant</u> to irradiation. 5- Ulcer <u>infiltrating</u> bone or cartilage because malignant cells are hidden so → • <u>Efficient dose</u> will leads to Irradiation Necrosis. • <u>Low dose</u> will leads to High Risk of Recurrence. > <u>Technique :</u> Excision with safety margin about 1 cm of surface & depth. ★ <u>Curettage & cautery:</u> if multiple ★ <u>Cryosurgery:</u> if small. ★ <u>Fluorouracil:</u> if superficial but this line has high rate of recurrence.	Same as Rodent ulcer ✦ ③ <u>IF</u> regional L.Ns are involved <u>Block Dissection</u> is indicated Otherwise they are monthly Examined.
* Prognosis :	<u>Cure Rate</u> = 100% but recurrent	<u>Cure Rate</u> = 90%

II

Diseases of Bursae, Tendons & Fascia

1

Bursitis

Introduction

- The Bursa resembles the synovial capsule of joint.
- It contains clear mucinous fluid to minimize friction.
- Types : (A) **Anatomical Bursae**
Present where Tendon passes over Bony surface or where superficial fascia & skin covering bony prominence.
- (B) **Adventitious Bursae (Non Anatomical)**
Developed over areas of repeated friction it is non anatomical i.e. Newly formed.

Chronic
Serous BursitisAcute
Simple Bursitis

Treated by : Rest

Acute
Septic Bursitis

Treated by: Drainage

Types of Chronic Bursitis

① House-maid's knee (Pre-patellar Bursa) →

- Present as S.C fluctuant swelling.
- Site : Over the lower part of patella.

② Student's Elbow (Olecranon Bursa)

- Present as lax fluctuant swelling.
- Site : Over the Olecranon process

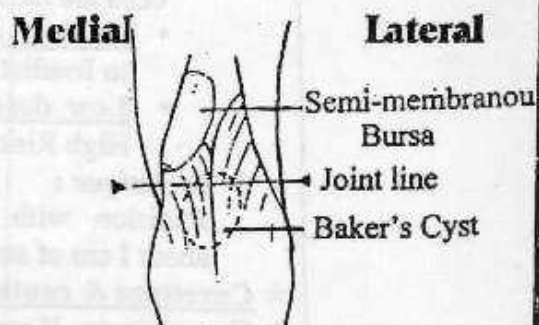
③ Semi-membranous Bursa →

- Present as Tense, fluctuant swelling & characterized by becoming Tense on Extension of knee & flaccid on Flexion of knee.
- Site : Medial part of popliteal fosse & above the joint line.

N.B. D.D from **Baker's Cyst** which is Herniation of synovial membrane of knee joint with oste-oarthritic patients & present at center of popliteal fossa below joint line.



Housemaid Bursa



Semi-membranous Bursa

Treatment

Excision of Bursa

2

Simple Ganglion

- **Definition** : It is a Myxomatous degeneration of fibrous tissue of Tendon sheath & Joint capsule. It contain jelly like mucin.
- **Clinical picture**:
 - Localized, Tense, Cystic, painless & related to tendon
 - Back of wrist is the commonest site.
 - It is mobile across but not along and it's mobility restricted with tendon action.
- **Treatment**
Rupture by compression or Excision



3

Compound Ganglion

- **Definition**: It is a T.B Synovitis of synovial sheath of the tendons passing under flexor Retinaculum. The synovial sheath becomes distended with T.B. granulation tissue.
- **Clinical picture** :
 - ① Localized, Fluctuant swelling.
 - ② At the lower part of flexor Retinaculum.
 - ③ Characterized by "Cross Fluctuation Test"
- **Treatment**: Anti-T.B drugs + Immobilization in Plaster Cast.

Swelling of Popliteal fossa :**A- Cystic swellings :**

- ① Skin and S.C. tissue : Abscess, Haemangioma, Lymphangioma.
- ② Vein : Saccular varicosity of upper end of short saphenous vein, VV.
- ③ Artery : Popliteal aneurysm, arterio - venous fistula.
- ④ Semimembranosus bursitis.

B- Solid swellings :

- ① Skin and S.C. tissue : Lipoma, Neurofibroma.
- ② Muscles : Fibrosarcoma.
- ③ Nerves : Neurofibroma.
- ④ Periosteum : Fibrosarcoma.
- ⑤ Bones : Acute and chronic osteomyelitis, osteoclastoma, osteosarcoma, secondaries of lower end of femur or upper end of tibia.

III Superficial Swellings & Tumors

1 Desmoid Tumor

* **Definition:**

Locally malignant tumor arising from the fibers of Anterior rectus sheath.

* **Incidence:**

- Multipara female (80%).
- Common with (Gardner's syndrome)

N.B. : Gardner's syndrome : Familial polyposis coli + osteoma + sebaceous cyst + Desmoid tumor.

* **Aetiology:**

Due to previous surgical incision or overstretching of Anterior rectus sheath.

* **Pathology:**

- **Site :**
 - It arises in the rectus sheath below level of umbilicus.
 - It is usually arises to one side (usually Rt.) Never in midline.
- **N/E :**
 - Pinkish, hard & non capsulated mass.
 - Cut section shows parallel fibers like tendon and hence the name (Desmoid tumor).
- **M/P:** It resemble to fibroma but with giant body cells, so called (Recurrent fibroma of paget).

* **Spread:** Only local, early to mother muscle then to surrounding.

* **Clinical Picture :**

- Slowly growing, hard (painless swelling in the lower abdomen with ill defined edge.
- At site of a previous abdominal scar.
- It can moves side to side & becomes fixed on contraction of the muscle.

* **Investigations :** CT scan & MRI.

* **Treatment:** Only by side excision with 1 inch safety margin including the whole thickness of the muscle and the defect in the abdominal wall is repaired with Proline or Nylon mesh.

2 Spinal Bifida

* **Definition:** Congenital absence of Post. Neural arch of the vertebrae with or without meningeal & cord compression.

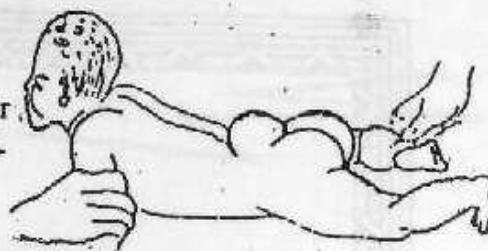
* **Site:** Most common at lumbo-sacral.



Spinous process.
Transverse process.
Lamina

*** Types :****[I] Spina Bifida Occulta :**

The defect in spine & lamina only, there is dimpling in the skin over it with tuft of Hair & dilated veins.

**[II] Spina Bifida Manifesta :****① Meningocele :**

- Protrusion of meninges through lumbar defect.
- C/P : No paralytic lesion & Hydrocephalus is common.
- Diagnosis : Cystic Translucent mass.

② Myelocele :

- Protrusion of cord through lumbar defect.

③ Meningomyelocele :

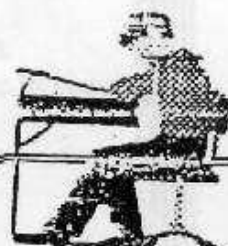
- Protrusion of meninges & cord through lumbar defect.
- C/P : Paralytic lesion & Hydrocephalus is rare.
- Diagnosis : Cystic Opaque mass.

*** Treatment :**

- ① Excision with repair of the defect to avoid rupture & meningitis.
- ② Shunt operations if hydrocephalus developed.



Final Written Exams



1995 • Give an account on Cystic Hygroma.

(10 Marks) دور ثانی

1996 • Discuss the Aetiology, Pathology & Treatment of Basal Cell Carcinoma of skin

(25 Marks) دور ثانی

1997 • Rodent ulcer : pathology & treatment

(10 Marks) دور ثانی

1998 • Discuss Pathology, Diagnosis & treatment of Rodent Ulcer of the face.

(10 Marks) دور ثانی

• Discuss Malignant Melanoma.

(10 Marks)

2000 • Discuss Aetiology & pathology of Rodent ulcer

(10 Marks)

2001 • Discuss C/P & Treatment of squamous cell carcinoma

(10 Marks) دور ثانی

2002 • Discuss path & C/P of Rodent ulcer

(12 Marks)

2003 • Discuss DD of an ulcers of the face

(10 Marks)

Chapter [15]

The Hernia

Chapter [15]

The Hernia

* Definition :

- **Hernia** is the protrusion of a viscus or part of viscus within a peritoneal sac through an opening or a weak part of abdominal wall.

* Site :

[1] **Inguinal Region** : (i.e. Inguinal Hernia) **1st common**

- Area above inguinal ligament (Groin crease).

N.B. It may be Indirect or Direct.

[2] **Femoral Region** : (i.e. Femoral Hernia).

- Area below inguinal ligament (Groin crease).

N.B. [1] & [2] called **Groin Hernia**.

[3] **Umbilical Region** : (i.e. Umbilical Hernia).

- Area midway between the xiphisternum and symphysis pubis
i.e. At normal site of umbilicus.

N.B. a) **Umbilical Hernia**: Is Central and Rounded in shape.

b) **Para-umbilical Hernia**: Is Excentric and Creasentic in shape.

[4] **Epigastric Region** : (i.e. Epigastric Hernia).

- Area away from umbilicus at site of linea Alba.

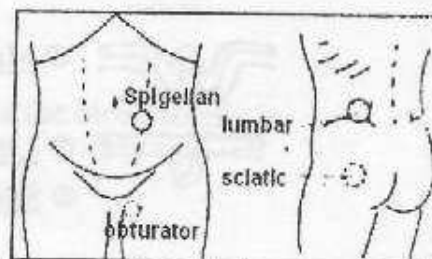
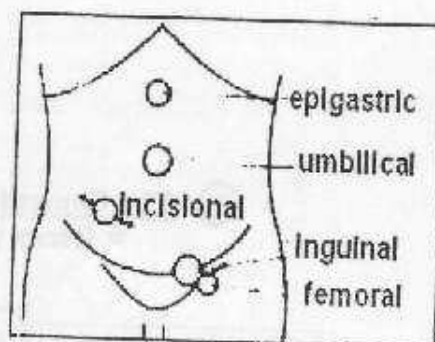
N.B. [3] & [4] called **Abdominal Hernia**.

[5] **Incisional hernia** : (i.e. Post-operative Hernia) **2nd common**.

N.B. The commonest incisional hernia is post-appendectomy.

[6] **Others**: Rare sties of Hernia **as** ∅

- **Obturator Hernia** : Through Obturator foramen.
- **Lumbar Hernia** : Through Lumbar region
- **Gluteal Hernia** : Through Greater sciatic foramen.
- **Sciatic Hernia** : Through Lesser sciatic foramen.
- **Spigelian Hernia** : Through Linea semi-lunaris



* Aetiology : It may be ∅

- (A) **Congenital** : due to presence of a **Congenital Performed Sac**.
e.g. the Remains of processus vaginalis (Congenital Inguinal Hernia).
- (B) **Acquired** : (due to).

[1] **↑ Intra abdominal pressure**:

- **Chronic straining** → Cough, Constipation or Senile Enlargement of Prostate (SEP).
- **Abdominal swelling** → Pregnancy, Ascites or Hepato-splenomegaly (HSM)
- **Occupational** as Porters.

[2] Weakness of abdominal wall:

- Obesity → Fat separate the muscle bundles and weakens the aponeurosis.
- Stretching by pregnancy.
- Previous operations.

*** Structure :**

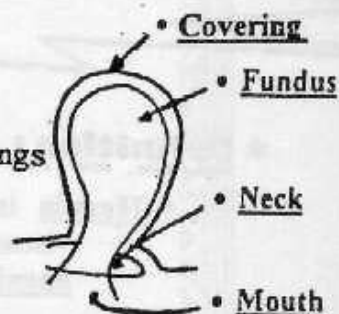
(A) The Defect + (B) The sac + (C) the content + (D) coverings

(A) The Defect : Through which sac bulges out.

(B) The Sac :

• The sac has many shapes (see below) →

- Pear-Shaped : Indirect (oblique) inguinal hernia.
- Hemispherical : Direct inguinal hernia.
- Tube-Like : Funicular type of (O.I.H.)
- Multilocular : Para-umbilical Hernia (P.U.H.).
- Conical : Infantile hernia.



(C) The Content :

★ It may be any organ except the Pancreas.

	① If intestine →	② If Omentum →
	Enterocoele	Omentocoele
Consistency →	• Soft	• Doughy
Reducibility →	• 1 st part difficult, <u>because</u> of gases.	• <u>Last part</u> difficult, <u>because</u> adhesion of sac and omentum.
	• Show <u>gurgling</u> sensation	• Show <u>doughy</u> sensation.
Percussion. →	• Resonant,	• Dullness.
Palpation →	• Lobulated surface.	• Smooth surface

N.B. Special Contents

- ③ Richter's Hernia : • A portion of Circumference of intestine.
• It occurs with femoral hernia.
• Diagnosed only if strangulated.



- ④ Maydl's Hernia : Two loops of the bowel (Hernia-in-W) the intermediate loop lies in peritoneal cavity.



- ⑤ Littre's Hernia : The content is Meckel's Diverticulum.

- ⑥ Sliding Hernia : Urinary Bladder may be adherent to the wall of hernial sac.

- ⑦ Pantaloon (Dual – saddle) Hernia : (Not Rare)

The are 2 sacs which saddle the Inf. Epigastric artery pulling on the neck of one sac to be single sac then Trans-fixiation & excision is done.

- ⑧ Interstitial Hernia : If the sac of hernia passes between the layers of abdominal wall instead of descending into serotum.

It may pass :

- ① Between the peritoneum & Transversalis fascia (Proportioneal type).
- ② Between the internal & external oblique (Intraparietal type).
- ③ Between the skin & external oblique (Proparietal type).

(D) The coverings : Derived from layers of Abdominal wall.

Complications of Hernia

1 Inflammation

- ★ It is Inflammation of contents or 2ry to using a truss. The patient complaint of (Fever, Headach, Malaise & Anorexia). The Treatment is observation only.

2 Irreducibility

★ Definition :

Failure to return the contents into the Abdomen.

★ Aetiology :

- Adhesions between the contents & the sac.
- Adhesions between the contents themselves.
- Protusion of new content during strain.

★ D.D :

	Irreducible	Obstructed	Strangulated
• <i>Acute Obstruction</i>	-	+	+
• <i>Impulse on cough</i>	+	+	-
• <i>Tense & Tender</i>	-	-	+

★ Treatment :

Irreducibility increases the risk of obstruction & strangulation. This means early operation {must be according to type of Hernia} Then cut of adhesions & reduction of hernia.

3 Obstruction

★ Definition :

Occlusion of intestinal lumen from outside or inside but the blood supply is still unaffected.

★ Aetiology :

Usually 2ry to irreducibility.

★ Clinical picture :

Symptoms of A.I.O (Constipation, Colics, Distention & Vomiting)

★ D.D :

As above

★ Treatment :

Early surgery as DD between it & Strangulation is very difficult.

4 Strangulation

* Definition :

The Hernia becomes strangulated when the blood supply of it's content is seriously impaired.

* Incidence :

[A] It varies according to the Type of Hernia

- | | |
|------------------|---------------|
| • Inguinal | 2-4% |
| • Femoral | 25-30% |
| • Para-umbilical | 15-20% |
| • Incisional | 3-5% |

[B] Although the incidence is higher in Femoral Hernia, yet strangulated inguinal hernia account for more than 50% (As it is more common)

[C] Strangulation occur at any age & commoner after Truss

* Predisposing Factors :

- ① Inflammation, Irreducibility & Obstruction.
- ② Sudden Expulsion of new contents following straining.
- ③ Repeated attempts at reduction producing oedema

* Pathology :

(A) The Constricting Agents

- Any Resistant structure outside the sac As
- Neck of the sac.
- Bands of adhesions within the sac.

Superficial or Deep ring.
With inguinal Hernia

Sharp edge of lacunar ligament.
With femoral Hernia.

Defect in linea Alba.
With para-umbilical Hernia

(B) The Contents

- Constricting Agents will compress the veins in the intestinal mesentery (Thin walled) → ↑ Venous pressure → Oedema and Congestion of intestinal loops. If the congestion is marked increased → Haemorrhage in intestinal Wall & lumen
- Further rise of pressure → Impairment of arterial blood supply So the contents lose their vitality & may be undergo gangrene.
- Finally, Gangrene occurs : It starts at ring of constriction then affects the anti-mesenteric border of intestine. If perforated → Peritonitis.

N.B. Neglected Cases will die from Septic Shock & Dehydration

* Clinical picture :

(A) General Examination

- Manifestations of (A.I.O) (Constipation, Colics, Distention and Vomiting).
- Hypovolaemic shock & signs of dehydration
- If Gangrene occurs → Peritonitis → Paralytic ileus
i.e. No colics which is "Bad sign" → Finally septic shock.

N.B. * Manifestations of (A.I.O) are absent with ☞

- ① Strangulated Omentum.
- ② Strangulated Richter's Hernia.
- ③ Strangulated Littre's Hernia.

* In Maydl's Hernia : The Gangrene affect the intermediate loop which lies in the Abdomen as it has the most distant blood supply. So that you must looking for it during the operation.

(B) Local Examination "Cardinal signs of Strangulation"

- ① Tense & Tender
- ② Irreducible
- ③ No Impulse on cough.

* **D.O :**

	<u>Irreducible</u>	<u>Obstructed</u>	<u>Strangulated</u>
• <u>Acute obstruction</u>	-	+	+
• <u>Impulse on cough</u>	+	+	-
• <u>Tense & Tender</u>	-	-	+

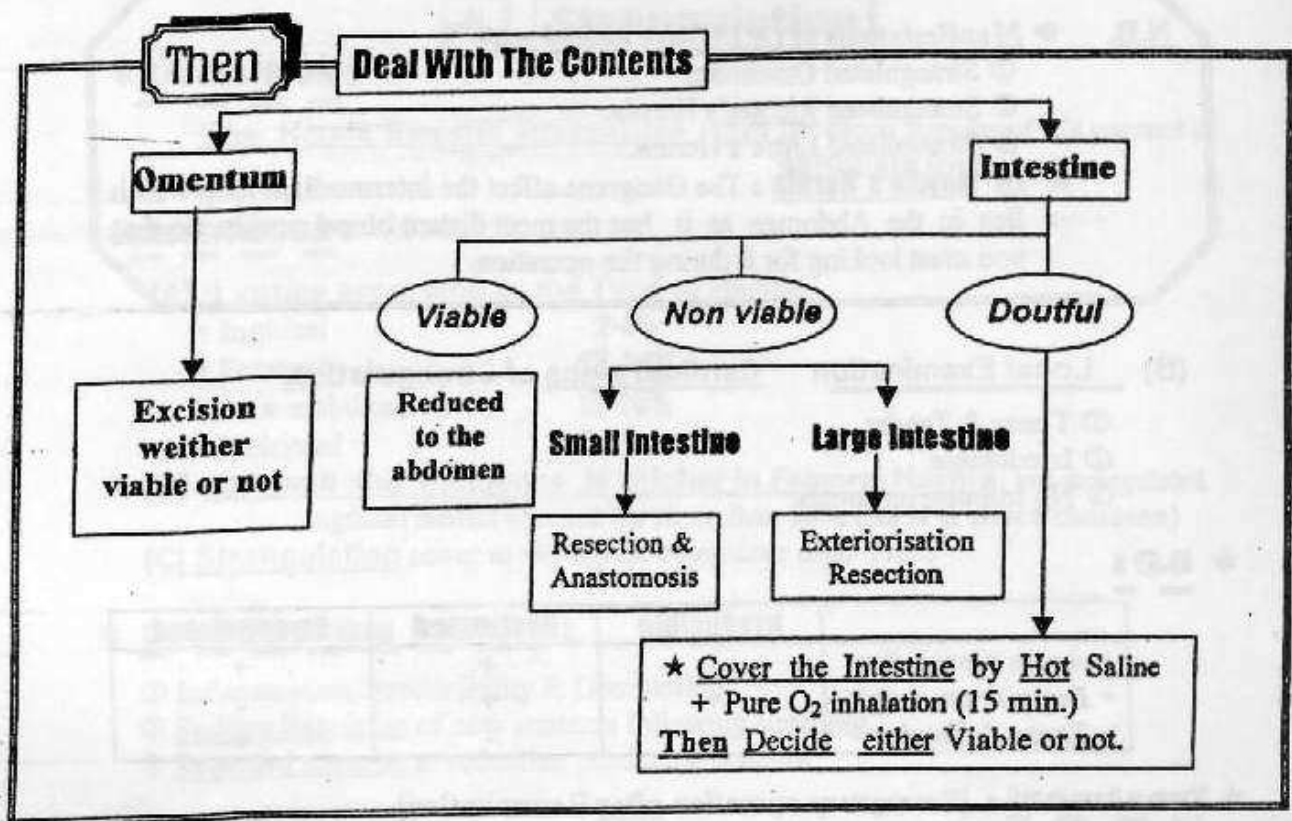
* **Treatment** : [Emergency operation after Resuscitation]**(A) Immediate Resuscitation**

- ① Hospitalization.
- ② Ryle's Tube for suction.
- ③ Urinary Catheter is applied.
- ④ I.V Fluids To correct electrolyte imbalance
- ⑤ I.V Blood & Ringer's Lactate to correct Hypovolaemia.
- ⑥ I.V. Broad spectrum A.B. to guard against Septic Shock.

(B) Immediate Operation

- ① Incision should be planned to Expose the fundus of sac and Open it to Evacuate Toxic fluid 1st.
- ② The constricting agents should be divided over the fingers to avoid injury of intestine.
- ③ The contents are pulled out & Examined, viable or not ☞

	<u>Viable Intestine</u>	<u>Non-viable Intestine</u>
• Intestinal Color	• Pink or Dark red	• Brown or Black.
• Peritoneal Lusters	• Present.	• <u>Absent</u> .
• Mesenteric Arteries	• Pulsating	• <u>Non-pulsating</u>
• By <u>Pinching</u>	• Contracts	• <u>No Response</u>
• Consistency	• Firm	• Floppy
• If Injured	• Bleeding occur	• <u>No Bleeding</u>



N.B. : Intra-operative Test to Detect the Vitality : ☞

- Doppler U/S.
- Fluorescein Test : Inject 1gm Fluorescein I.V then Inspect the bowel under ultra-violet rays. IF the bowel has good Blood supply it will fluoresce.
- Oximeter.

- ④ Repair the Hernial Defect by **Prolene** sutures.
- ⑤ Subcutaneous Drain is usually used.
- ⑥ Post-operative Care (a) Continue Ryle's suction with I.V fluid.
(b) Prophylactic A.B.
(c) Removal of drain after **5** days.

N.B. Special Case

- [Conservative measure occur during pre-operative preparation in infants with O.I.H. which has strangulated for less than 6 hours].
- Through Genital TAXIS
In a number of infants the reduction of Hernia is easily obtained by gentle Flexion of thigh & Internal rotation to hip.
- Complications of Taxis
 - ① Rupture of sac or Intestine at neck of sac.
 - ② Reduction of gangrenous part into the abdomen → Peritonitis.
 - ③ Reduction-in-mass : ☞
The sac Together with it's content are forced back in one mass i.e. swelling disappear but symptoms are persist.

5 Hydrocele of Hernial Sac

* Aetiology:

When narrow necked sacs becomes occluded by omentum or adhesions after reduction of it's contents → collection of serous fluid in the sac.

* Clinical Picture:

Cystic translucent inguino scrotal swelling.

* Treatment: Excision.

6 Rupture of Hernial Sac

Excessive manipulation of the Hernia → Rupture of sac → protrusion of hernial contents in the S.C. tissue.

N.B.

Recurrent Inguinal Hernia

* Incidence: 10% (75% indirect & 25% direct)

* Aetiology: As incisional Hernial +

- ① Leaving part of the original Sac.
- ② Missing a second sac at operation e.g. Pantaloon Hernia.

* Treatment:

Correction of predisposing factors + Hernioplasty.

N.B.

Sliding Hernia (Hernie – En – Glissade)

* Definition:

An Extra-peritoneal organ may be adherent to wall of hernial sac.

* Incidence:

- ① Common with old males & common with inguinal & femoral Hernia.
- ② The commonest sliding organs, urinary bladder, caecum & sigmoid colon.

* Clinical Picture:

- Old male with incomplete reducible Hernia.
- Urinary symptoms (double micturation) if sliding urinary bladder.

* Treatment: Graham's operation

Cut the part of the wall of the sac adherent to the sliding organ & separate it from the sac then the sliding organ is pushed back into the abdomen then the remnant of the sac is Transfixed & excised Then Finally repair is done.

Surgical Anatomy

Layers of Anterior Abdominal Wall

⇒ Skin

⇒ Superficial Fascia

- Superficial Fatty Layer & Deep Membranous Layer.

⇒ 3 Muscles :

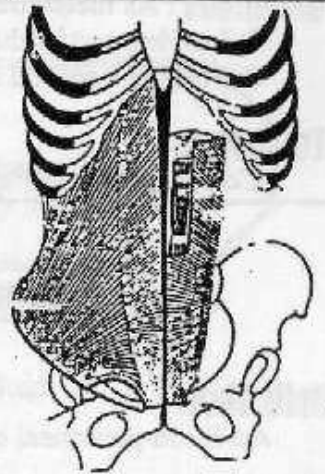
① External Oblique Muscle

- Origin : From outer surface of lower 8 ribs.
- Insertion : Xiphoid process, Linea Alba, A.s.i.s, outer lip of Iliac crest & Pubic tubercle.
- Surgical Importance :
 - *Fibers run* Downwards, Forwards & Medially
 - *The lower part becomes aponeurotic* and it's free border enfolded as Inguinal ligament
 - External Inguinal Ring is an opening of external oblique aponeurosis.



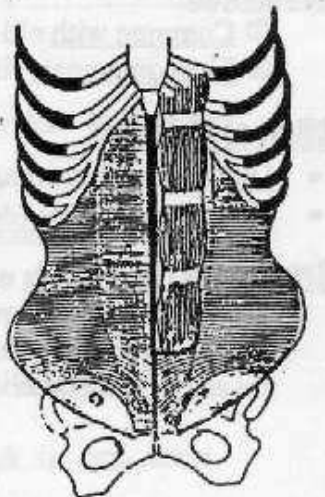
② Internal Oblique Muscle

- Origin : From lateral half of upper surface of inguinal ligament.
- Insertion : Lower 6 Costal cartilage, Xiphoid process & Linea Alba.
- Surgical Importance :
 - *Fibers run* Upwards, Forwards and medially
 - *The lower fibers* inserted as Conjoined Tendon with (Transversus Abdominis) muscle into the Pubic crest & Pectineal line.
 - *The lower border* covers the deep ring and the beginning of spermatic cord.



③ Transversus Abdominis Muscle

- Origin : From lateral 1/3 of upper surface of inguinal ligament & lower 6 Costal cartilage.
- Insertion : Xiphoid process & Linea Alba.
- Surgical Importance :
 - It is inserted as Conjoined Tendon with Internal Oblique muscle



⇒ Fascia Transversalis :

Thin but Strong fascial layer lies in front of the peritoneum. It gives the Deep Inguinal Ring.



★ Superficial (External) Inguinal Ring :

- It is a (Δ shaped) opening in Ext. Oblique Aponeurosis.
- It presents $\frac{1}{2}$ inch above & medial to Pubic Tubercle.
- It is an Exit for Spermatic cord & Ilio-inguinal nerve.

★ Deep (Internal) Inguinal Ring :

- It is a (U-shaped) opening at Fascia Transversalis.
- It present $\frac{1}{2}$ inch above mid-point of Inguinal ligament.
- It is an Inlet for Spermatic cord. The Inferior epigastric vessels run medial to it.

Inguinal Canal

(مهم جدا)

★ Definition :

It is an Oblique passage in the lower part of the Ant. Abdominal wall.

★ Course :

- It begins at Deep ring (1/2 inch above mid-point of Inguinal Ligament) then directed downward, forwards & medially.
- It's length about 1.5 inches (4 cm)
- It Ends at superficial ring (1/2 inch above & medial to pubic tubercle).

★ Contents :

★ Ilio-inguinal Nerve :

which pierces the post-wall of the canal then passes through superficial inguinal ring.

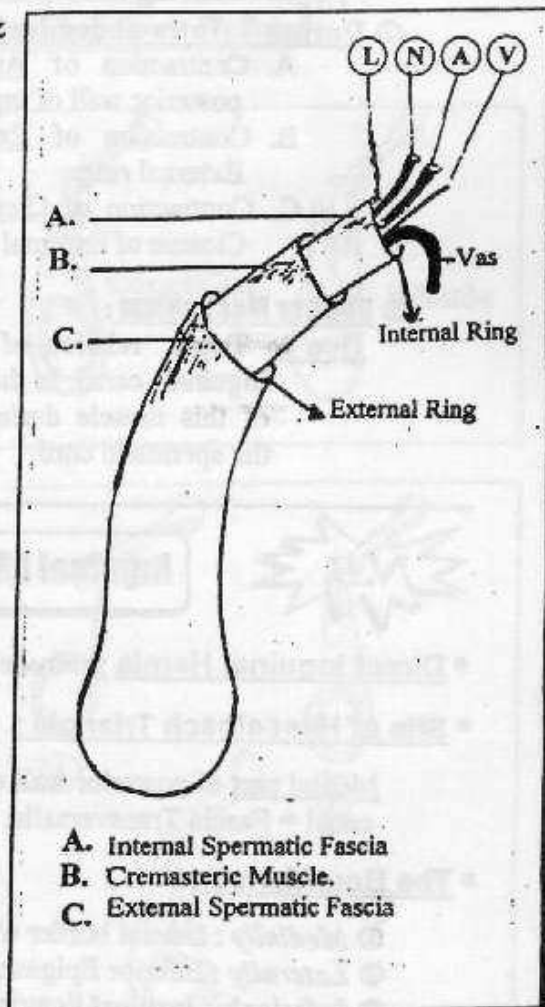
★ Spermatic Cord if Male
or Round Ligament If Female

Contents of the Spermatic Cord :

- ① Vas Deferens.
- ② Artery of vas & Testicular artery.
- ③ Vein of vas & Pampiniform plexus.
- ④ Autonomic Nerves.
- ⑤ Lymphatic vessels.
- ⑥ Vestige of Processus Vaginalis.
- ⑦ Genital br. of Genito-femoral n.

Coverings of the Spermatic Cord :

- ① External Spermatic Fascia from External Oblique Aponeurosis.
- ② Cremasteric muscle from Internal Oblique Muscle.
- ③ Internal spermatic fascia from Fascia Transversalis.



* Boundaries :

(A) Anterior wall :

- External Oblique Aponeurosis.
- Lower parts of Internal Oblique Muscle laterally.

(B) Posterior wall :

- Fascia Transversalis.
- Conjoined Tendon medially.

(C) Floor :

- Upper grooved surface of Inguinal ligament

(D) Roof :

- High arched fibers of conjoined Tendon.

* Factors prevent Inguinal Hernia :

① Inguinal canal is oblique So ↯

The Internal ring & External ring not at same Plane.

② During ↑ (Intra-abdominal pressure) the followings occur ↯

- Contraction of Anterior abdominal wall So that the anterior & posterior wall of inguinal canal are approximated.
- Contraction of External oblique muscle leads to narrowing of External ring.
- Contraction of Cremasteric muscle leads to elevation of scrotum, so Closure of External rings occur.

③ Shutter Mechanism :

Due to Triple relation of the lower fibers of Internal oblique muscle to the inguinal canal. In the [Anterior, Roof & Posterior wall] So contraction of this muscle during strain leads to closure of Inguinal canal around the spermatic cord.



Inguinal (Hasselbach) Triangle

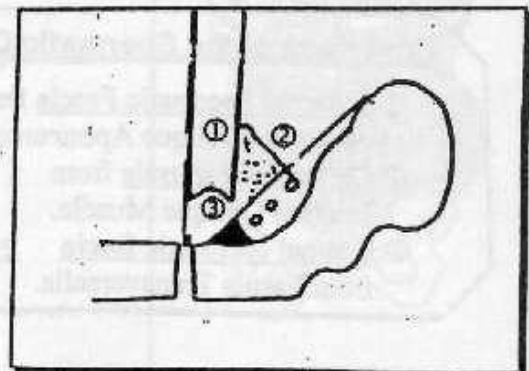
- Direct Inguinal Hernia protrude through this Triangle

▪ Site of Hasselbach Triangle :

Medial part of posterior wall of Inguinal canal = Fascia Transversalis.

▪ The Boundaries :

- ① Medially : Lateral border of Rectus sheath.
- ② Laterally : Inferior Epigastric vessels.
- ③ Inferiorly : Inguinal ligament.



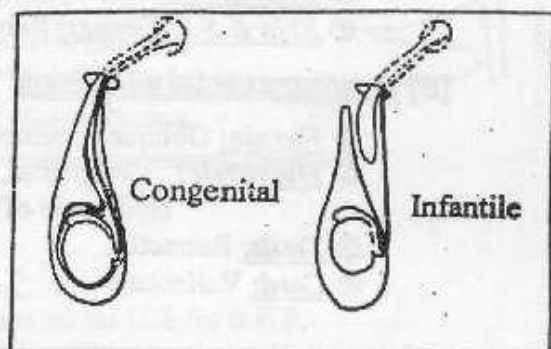
	Indirect (Oblique) Inguinal Hernia	Direct Inguinal Hernia
* Clinical Picture : 1. Age. 2. Sex. 3. Side. 4. Shape. 5. Direction of <u>descent</u> . 6. <u>Descent into scrotum</u> . 7. Reduction. 8. Internal Ring Test. 9. External Ring Test. 10. Complications.	- Any Age. - More in Male. - Less common bilateral 30%. - Pyriform (Oblong). - Downwards, forwards and medially - Can descend. - Upward, backwards and laterally. - Not descend. - Wide ring and show impulse at tip of little finger. - More common.	- Usually <u>old</u> age - Always in Male. - More common bilateral 50%. - Hemispherical (Rounded). - Forwards only. - Extremely <u>Rare</u>. - Backwards only. - Descent. - Normal ring and show impulse at medial side of little finger. - Less common.



Special Types of Indirect (Oblique) Inguinal Hernia

① Congenital Hernia :

- Due to persistency of processus vaginalis.
- It reaches down the scrotum from the start & lies among it's content.
- Although being Congenital but may be appeared with adult life.



② Infantile Hernia :

- Tunica vaginalis extends upwards to the External Ring.
- True hernial sac passes behind it i.e. 2 Sacs.
- It is operative finding only.

③ Adult Type : Which may be

(A) Bubonocoele Type :

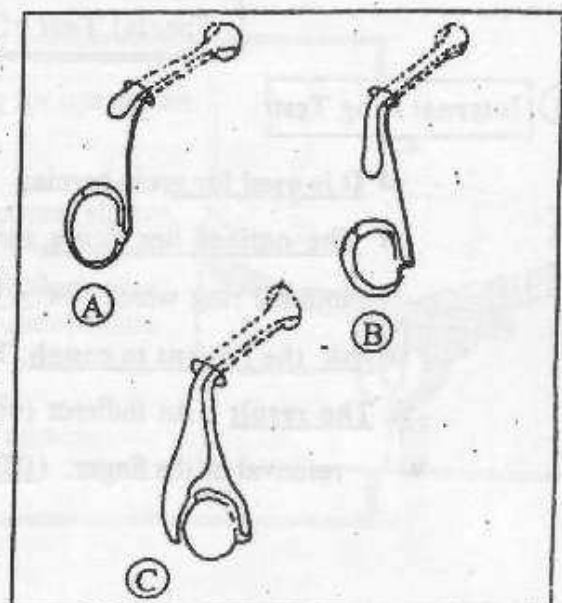
Hernia is Limited to the inguinal canal & Seen as bulge or mass at Inguinal region.

(B) Funicular Type :

Hernia passes with cord & stops just Above the Epididymis

(C) Complete scrotal Hernia :

Hernia descends to the bottom of Scrotum. The Testis behind the hernia



N.B.

Special Types of Direct Inguinal Hernia**① Lateral Type:**

Which bulges through the lateral part of Hasselbach's Δ (made by Fascia Transversalis) only & Thus has a very wide neck & is less liable to complicate.

② Medial Type:

Which bulges through a defect in the conjoint Tendon in front of fascia transversalis in the medial part of Hasselbach's Δ . The edge of the defect is sharp + narrow neck & is more liable to complicate.

*** DD of Inguinal Hernias:**

From (other Inguinal & Inguino-scrotal swellings)

[A] Inguinal Swellings:

- ① Hernia: Bubonocoele & Direct Inguinal Hernia.
- ② Hydrocele: Hydrocele of Hernial sac. & Encysted hydrocele of the cord.
- ③ Testis: Undescended, Ectopic or Retractable.
- ④ Cord: Nodule or Lipoma.
- ⑤ Iliac L.Ns: Just above inguinal ligament.
- ⑥ Iliac Artery: Aneurysm.
- ⑦ Skin & S.C Tissues: Sebaceous, lipomaetc.

[B] Inguino-scrotal swellings:

- ① Hernia: Oblique Inguinal Hernia (Complete Type)
- ② Hydrocele: Congenital, Infantile, Hydrocele of Hernial sac & Encysted Hydrocele of the cord.
- ③ Testis: Retractable.
- ④ Cord: Varicocele

Special Test of Hernia**V. Important****① Internal Ring Test**

- ☆ It is used for groin hernias.
- ☆ The patient lies down and the hernia is reduced then put your finger over the internal ring which lies ½ Inch above mid point of inguinal ligament
- ☆ Ask the Patient to cough. Then repeat while standing.
- ☆ The result : An indirect (oblique) inguinal hernia does not protrude except after removal of the finger. (DD direct inguinal hernia).

II External ring test (المريض واقف)

☆ It is used for groin hernias.

☆ The patient is standing and the hernia is reduced then put your little finger is passed into the external ring, invaginating the scrotum, with your nail towards the spermatic cord.

→ Normally : The external ring admits just the tip of the little finger.

→ If the ring is wide : Indirect inguinal hernia.

☆ Ask the patient to cough then

☆ The result

→ Impulse on the tip of the little finger : Indirect inguinal herina .

→ Impulse on the medial side of the little finger = Direct inguinal herina.



III Zieman's Technique (المريض واقف)

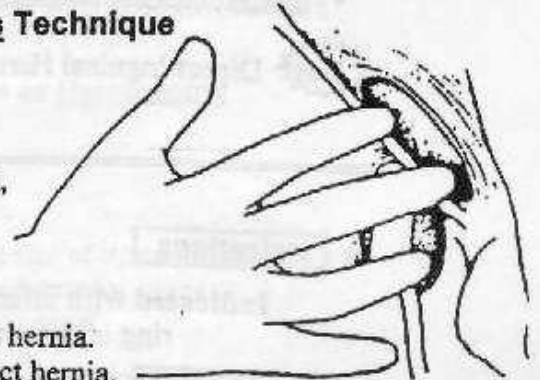
Zelman's Technique

☆ Indication : If no obvious lump is detected, the presence and site of hernia may be by it.

☆ Technique : Placing you index finger over internal ring, and the middle finger over external ring, and the Ring finger over femoral canal.

☆ Ask the patient to cough.

☆ The result → At Index finger (Internal ring) = Indirect hernia.
At Middle finger (Inguinal canal) = Direct hernia.
At Ring finger (Femoral canal) = Femoral hernia.



* Management of Inguinal Hernia:

[A] Investigations: To detect underlying cause of I.A.P:

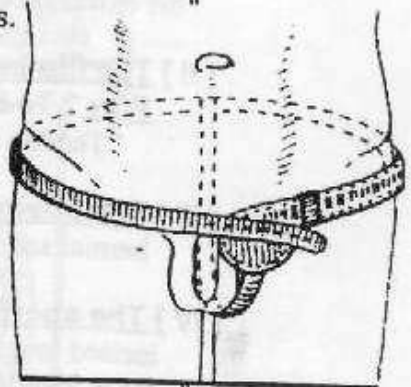
Chest X-ray, Abdominal U/S & Trans-rectal U/S for S.E.P.

[B] Treatment :

① Truss :

- Indications : ① Infant below 3 months waiting for operations.
② Old patient.
③ Unfit for surgery.
- Contraindications : ① Irreducible hernia or femoral Hernia.
② Obese patient (Diffcult to use truss).
③ Presence of another pathology as varicocele or undescended testis.
- Complications : ① Infection.
② Adhesion → strangulation.
③ Pressure atrophy of local muscle.

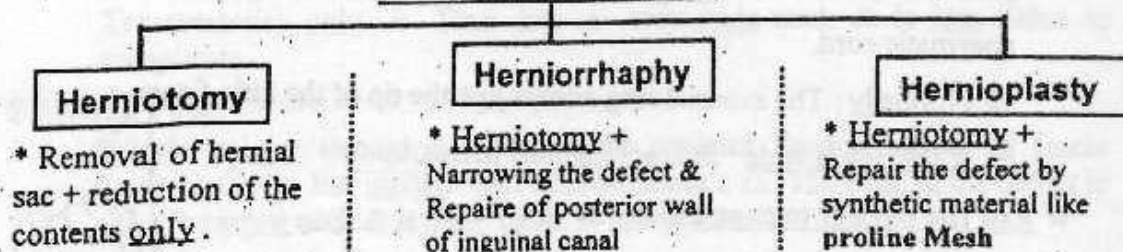
② Operations : See below



HERNIAL OPERATIONS

I Operations for Inguinal Hernias

1. Indirect (oblique) Inguinal Hernia



2. Direct Inguinal Hernia

- The Above mentioned 3 Types of Hernial operations are suitable for " Indirect Inguinal Hernia " only.

But Direct Inguinal Hernia : Herniorrhaphy or Hernioplasty is done
i.e no Herniotomy is done alone

A Herniotomy

★ Indications

Indicated with infants & children below 12 years. Why ? Because the Deep ring is unstretched + good musculature for Inguinal canal.

★ **Anesthesia** " General or Spinal "

★ **Position** " Supine "

★ **Incision**

Inguinal incision : 1 finger above & parallel to medial 2/3 of Inguinal ligament :

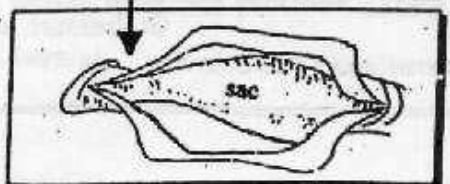
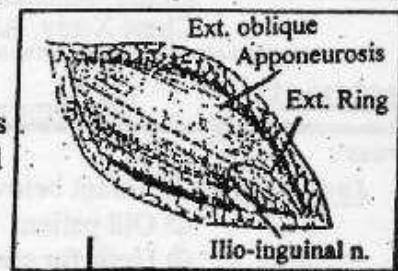
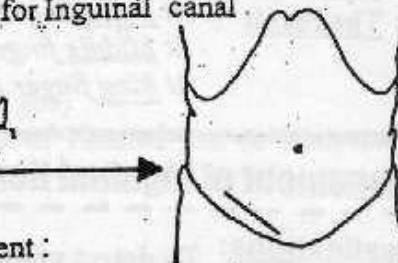
★ Steps

[I] The External oblique Apponeurosis is incised in line of it's fibers , So..That it opens the external ring so the inguinal canal is opened

[II] The Ilio-inguinal nerve is protected
Why ? To avoid paralysis of conjoint Tendon so prevent Direct Hernia .

[III] The spermatic cord in which the hernial sac lies is hooked by ring forceps .

[IV] The spermatic cord coverings are incised longitudinally and the hernial sac is Identified by being
① Pearly in shape
② white in colour .
③ Antro-lateral to their cord structures .



Then The neck of the sac is identified by being

- ① The narrowest part of the sac .
- ② surrounded by Extra-peritoneal Fat .
- ③ Lateral to inferior Epigastric vessels .

[V] The **sac** is opened and the contents are reduced

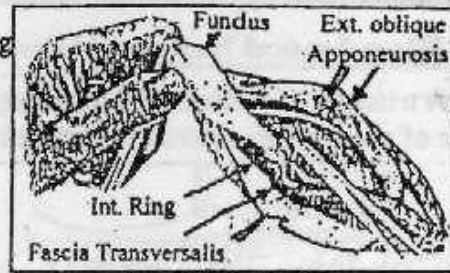
[VI] The **Neck of Hernial sac** :

Transfixed & ligated as high as possible then Excised .

[VII] The **Cord coverings** :

Resutured again **then** the wound is closed in layers .

N.B: No drains are used



(B) Herniorrhaphy

* **Indications**

Indicated with large Hernial defect in adult or Elderly with good musculature

* **Anesthesia** + **position** + **Incision** → same as **Herniotomy**

* **Steps**

(A) **Herniotomy** : As Above

(B) 2 steps 1- **Narrowing** of stretched Internal ring to the size of tip of little finger .
By plication of the Fascia Transversalis
2- **Reinforcement** of posterior wall of Inguinal canal
By One of the followings :

[I] **Bassini Repair** :

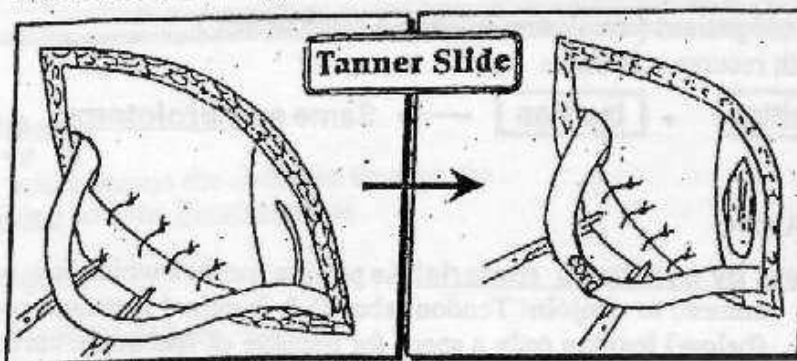
- Suture the conjoint Tendon down to the inguinal ligament behind the cord .

Q: **Why Bassini repair is unphysiological ?**

Because ① Interferes with shutter mechanism of inguinal canal during ↑ I.A.P
② Healing is very weak between fleshy muscle & Tendinous ligament.

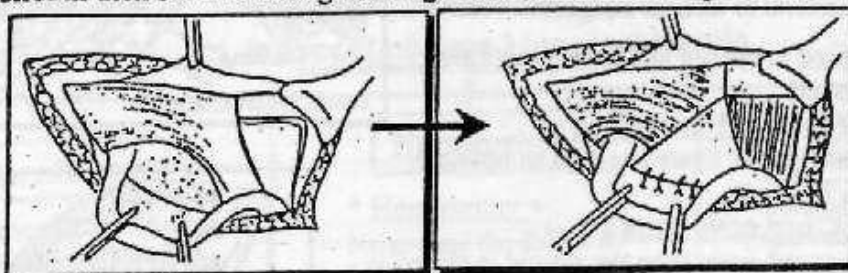
Q: **What is meant by "Tanner slide"?**

If there is tension in the repair , we do "Tanner slide" = Relaxing incision in the Rectus Sheath to prevent this Tension .



[II] Blood-good Repair (Uses of Rectus sheath)

A triangle of Anterior Rectus sheath is turned laterally & hinged on lateral border of sheath then sutured to Inguinal ligament, behind the spermatic cord.



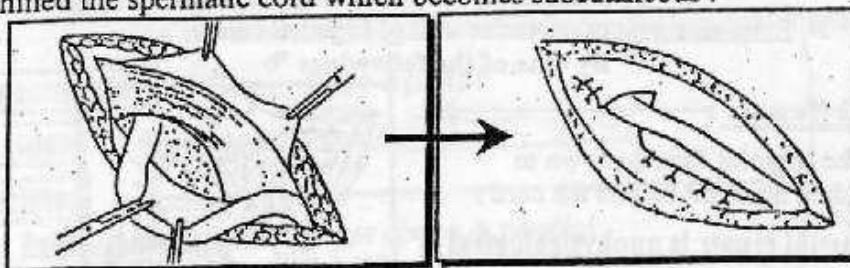
[III] Shouldice Repair

The Fascia Transversalis is divided longitudinally along the posterior border of the canal. Then Double Brusting is done i.e the lower flap is sutured to the under surface of upper flap.



[IV] Halsted Repair (Anterior Transposition of the cord)

suturing the External oblique Apponeurosis to the inguinal ligament behind the spermatic cord which becomes subcutaneous.



[V] Mc vey's Repair

Brings the Transversals Fascia further posteriorly & Inferiorly to pectineal ligament. It is effective in the repair of inguinal hernia associated with femoral Hernia.

(C) Hernioplasty

★ **Indications**

Indicated with old patient (weak musculature + wide defect)
or with recurrent Hernias

★ **Anesthesia** + **Position** + **Incision** → Same as Herniotomy

★ **Steps**

(A) Herniotomy : As Above

(B) Repair of the defect by synthetic material As proline meshes which is sutured to conjoint Tendon (above) & Inguinal ligament (below) leaving only a space for passage of spermatic cord.

Q: What are the old natural methods for hernioplasty ?

Answer : using skin graft or fascia lata i.e. Natural graft.

2

Femoral Hernia

Surgical anatomy of femoral canal

○ Femoral Canal :

◎ Structure :

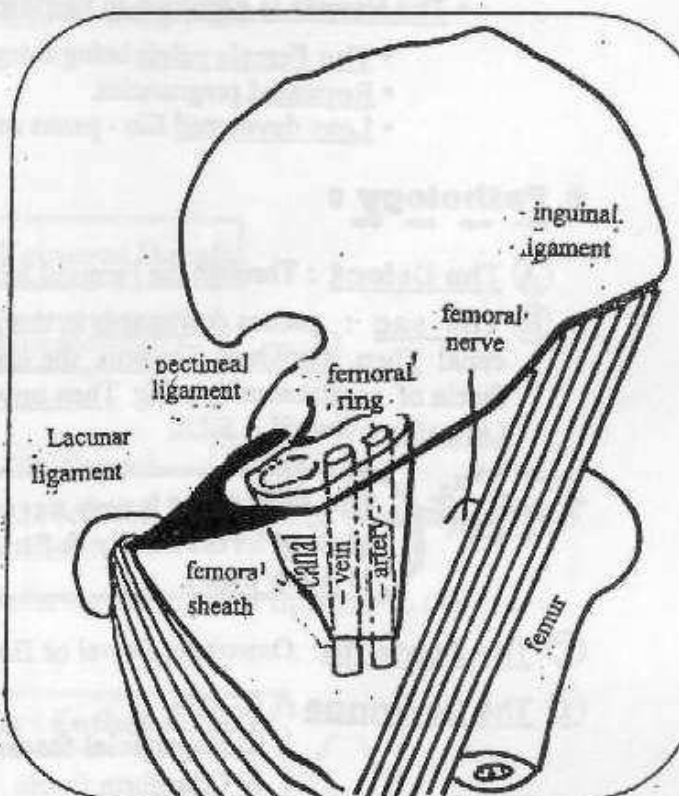
- It the most medial compartment of femoral sheath, the intermediate compartment is occupied by the femoral vein and the lateral one by the femoral artery.
- Cone shaped, 1/2 inch long.
- Its mouth (femoral ring) opens up behind the inguinal ligament.
- Its apex : is below and is formed of fusion of medial border of the femoral sheath & septum between the femoral canal & the femoral vein.

◎ Contents :

Fat, lymphatics & L.Ns of Cloquet.

◎ Function :

Give space for expansion of the femoral vein during venous return with lower limb exercise.



○ Femoral Ring : (Mouth of the femoral canal)

- Boundaries :
 - Anteriorly : Inguinal ligament (pupart's ligament).
 - Posteriorly : (Cooper's pectineal ligament).
 - Medially : Lacunar ligament.
 - Laterally : femoral vein.

**ABNORMAL OBTURATOR ARTERY :**

It 30% of population the obturator artery is absent and the pubic branch of epigastric artery descends behind the lacunar lig. and passes through the obturator foramen to replaced the obturator artery.

* Definition :

Hernia which leaves the abdomen through the Femoral ring into the Femoral canal.

* Aetiology :

Always Acquired never congenital .

* Incidence :

- The 3rd common after incisional hernia
- It represent 20% of Hernial Female & 5% of Hernial Male.
- The Hernia is common in Female due to
 - The Female pelvis being Larger .
 - Repeated pregnancies.
 - Less developed Ilio - psoas muscle .

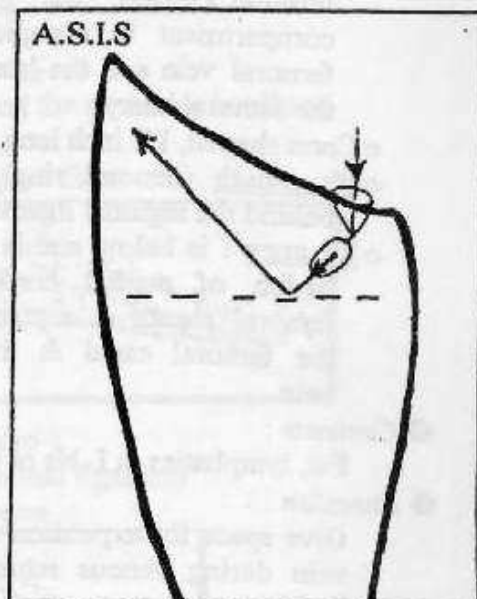
* Pathology :

- (A) The Defect : Through the Femoral Ring.
- (B) The sac : passes downwards in the Femoral canal Then forwards Towards the cribriform fascia of saphenous opening Then upwards & Laterally towards A.S.I.S.

N.B

The Neck of Sac is very narrow So the risk of irreducibility & Strangulation is Very high .

- (C) The Contents: Omentum, Bowel or Both
- (D) The Coverings : ① Skin
② Superficial fascia .
③ Cribriform fascia .
④ Ant. Layer of Femoral Sheath.



* Clinical picture :

- Age: 20-40 years
- Sex : Female > Male
- Mass :
 - Rt. > Lt but **20% Bilateral**
 - Present (Below Inguinal Ligament) & (Below & Lateral to Pubic Tubercle)
 - Give impulse on cough. It can be reduced Downwards, Backwards & Finally upwards. **But Clinically Impossible.**

* P.D. of swelling in Femoral Triangle :

- ① Lipoma : Characterized by (soft, smooth, slippery edge, superficial to muscles & skin over show dimpling).
- ② Femoral aneurysm : Characterized by (expansile pulsation).
- ③ Saphena varix: Characterized by (thrill on cough, completely disappear on lying down, venous hum on auscultation & apparent varicose vein).

- ④ Femoral L.Ns : As cloquet or part of generalized L.Ns.
- ⑤ Psoas abscess : Characterized by (cross fluctuation & x-ray spine shows pott's disease)
- ⑥ Ectopic testis : Characterized by empty scrotum.
- ⑦ Psoas bursitis : Characterized by osteoarthritis of hip joint.
- ⑧ Inguinal hernia : Above & medial to pubic tubercle.
- ⑨ Femoral hernia.

* Treatment : II Operations for Femoral Hernia

A Low Approach (Lockwood)

Steps

- ① The sac is Identified & dissected till it's neck.
- ② The sac is opened . The contents are reduced & Transfixed as higher as possible and excised .
- ③ Repair : Femoral ring is closed by suturing the Inguinal ligament to the pectineal ligament.



B High approach (Lotheissen's)

Steps

- ① The Inguinal Canal is opened then the lower skin flap is dissected down to expose the fundus of the sac which is pushed up from below to help the delivery of sac above inguinal ligament .
- ② The sac is opened . The contents are reduced . Then the sac is transfixed & excised .
- ③ Repair : Suturing the conjoint tendon to the inguinal ligament then to the pectineal ligament



C Pre-peritoneal approach

Incision

para-rectal incision at outer border of the lower of the rectus abdominis.

Steps

- ① The Anterior rectus sheath is opened, the muscle is retracted medially then the posterior rectus sheath is opened & Exposing the peritoneum .
- ② The Hernial sac is Identified and opened. Then the contents are reduced & Transfixed as higher as possible and excised.
- ③ Repair : see Mc Vay's Repair .



3 Umbilical Hernia

① Congenital② Infantile③ Adult

A

Congenital umbilical Hernia

Exomphalos

	Exomphalos Minor	Exomphalos Major
		
* Pathology : (A) <u>The Defect</u> (B) <u>The sac</u> (C) <u>The Contents</u> (D) <u>The Coverings</u>	▪ <u>Small</u> (< 5 cm) at the umbilicus ▪ Formed by <u>Peritoneum</u>. ▪ Usually <u>Bowel</u>. ▪ <u>Wharton's Jelly</u> + Layer of Amniotic membrane.	▪ <u>Large</u> (> 5 cm) at the center of abdomen. ▪ Formed by <u>Peritoneum</u> ▪ Usually <u>Bowel ± Liver</u> ▪ Layer of Amniotic membrane <u>only</u>
* Complications :	▪ During Ligation of the an umbilical stump, a loop of Intestine may be Entangled in the ligature	▪ Rupture may occur with infection → Peritonitis (The Cause of death)
* Treatment :	Content are reduced and returned to the abdomen Then sac is excised & The defect is repaired in layers	<u>Urgent operation:</u> <u>The Problem:</u> No Space in abdomen to accommodate the contents <u>So:</u> The skin on either sides of the defect is undercut then flaps will be sutured together over the sac + release incision over the flanks. <u>Later on:</u> If infant survive, definitive repair is done.

* **Treatment:** See Operative

III Operations for Para-umbilical Hernia (P. U. H.)

A Mayo's Repair

★ **Indication** Small defect

★ **Anesthesia** "General"

★ **Position** "Supine"

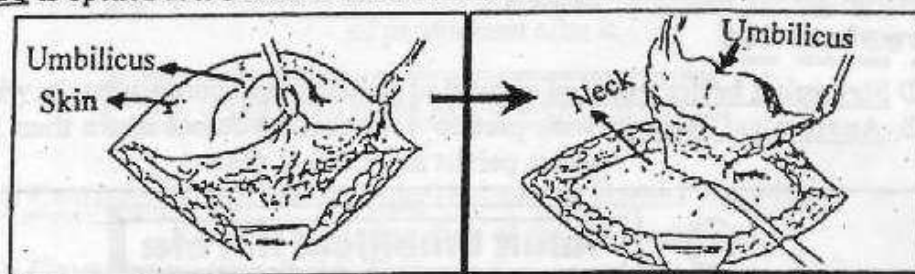
★ **Incision**

Transverse Elliptical incision is done over the Hernia & Enclosing The umbilicus

★ **Steps**

[I] The incision is deepened till the anterior rectus sheath is reached all around the sac.

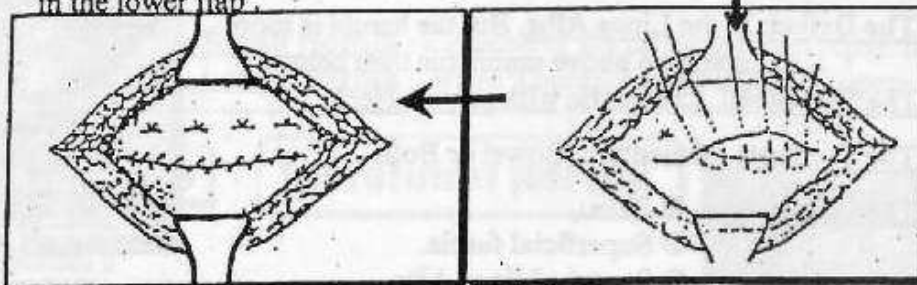
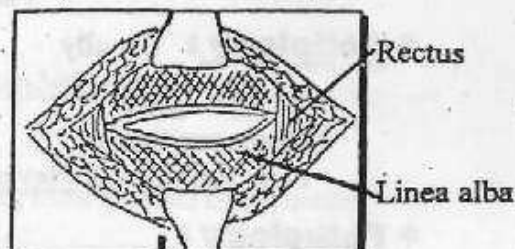
[II] The sac is opened at it's neck & the contents are reduced .



[III] The sac is excised with overlying skin and the defect in the linea Alba is widened on both sides till the red fibers of recti muscles appear .

[IV] Finally the upper flap of linea alba is sutured over the lower flap by Interrupted . transverse mattress sutures

[V] The free edge of upper flap is sutured in the lower flap .



[VI] The wound is closed over a subcutaneous drain .



B Hernioplasty

Indicated with Large defect & Recurrent Hernias .

(B)

Infantile Umbilical Hernia*** Aetiology :**

- ★ Weakness of the umbilical scar from infection or ↑ I.A.P from cough.

*** Pathology :**

- (A) The Defect : From Umbilical Scar.
- (B) The Sac : Small, conical with wide Neck
- (C) The Contents : Omentum, Bowel or Both.
- (D) Coverings : ① Stretched umbilical scar.
② Extra- peritoneal Fat.

*** Clinical Picture :**

Patient shows umbilical protrusion on cough.

*** Complications : Rare***** Treatment :**

- ① Strapping better avoided as most of cases closed spontaneously within 2 years
- ② Anatomical Repair with proline sutures if the defect more than 2 Fingers or the hernia persist more than 2 years



UMBILICAL HERNIA

(C)

Adult Umbilical Hernia**[Para - Umbilical Hernia]***** Aetiology : Usually**

- Middle aged.
- Obese multipara.
- Para- umbilical & Never umbilical.

*** Pathology :**

- (A) The Defect : In the Linea Alba. But the hernia is more common above umbilicus than below.
- (B) The Sac : Small, Crescentic with narrow Neck
- (C) The Contents : Omentum, Bowel or Both
- (D) The Coverings : ① Skin.
② Superficial fascia.
③ Stretched linea Alba.



PARA-UMBILICAL HERNIA

*** Clinical picture :**

Patient shows para-umbilical protrusion on cough (DD between supra-umbilical & Infra- umbilical hernias by the crescentic shape)

*** Complications : Common**

Especially Irreducible & Strangulated Complications

N.B. : Adult Umbilical Hernia (Acquired)

Usually seen with patient with Ascites or ↑ IAP as Everted umbilicus.

4

Epigastric Hernia*** Definition :**

It is Herniation of Extra – peritoneal fat.
It may be single or multiple.

*** Aetiology :**

Usually Acquired. It is formed as a direct result of sudden strain → Tearing of the Interlacing fibers of linea Alba.

*** Pathology :**

(A) The Defect : In the linea Alba (Midway between umbilicus & Xiphoid process.

(B) The Sac : may be 2 Types

① Fatty Hernia : it is a Protrusion of Extra – peritoneal fat only

② True Epigastric Hernia: Occurs if the protrusion enlarged, it drags a pouch of peritoneum after it.



EPIGASTRIC HERNIA

N.B. : The Neck of the Sac is very Narrow

(C) The Contents : The Sac is Empty (Because of Narrow Neck) or it contains a small portion of greater omentum.

(D) The Coverings : Skin & S.C Tissue .

*** Clinical picture :**

Patient Shows a small Irreducible protrusion simulating to lipoma .

*** Complications :**

Severe Epigastric pain with Nausia & Vomiting from friction of herniated omentum on the stomach (DD Peptic ulcer)

*** Treatment :**

★ Small Hernia : Excision of the fat lobule then repair the defect .

★ Large Hernia : Mayo's operation as for P.U.H. operations .

5

Incisional Hernia*** Definition :**

Hernia developing after Abdominal incision.

*** Aetiology :** It is frequently seen with

① Pre-operative Causes :

(a) Obesity .

(b) Poor health or D.M.

(c) Anaemia & Hypoproteinaemia.



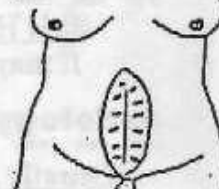
INCISIONAL HERNIA

② Operative Causes :

- (a) Uses of absorbable sutures .
- (b) Tight stitches → Devitalized tissues.
- (c) Insertion of a drain through the wound.

③ Post – operative causes :

- Persistent pre-operative causes or post-operative distension.
- Infection of wound .
- Lifting heavy object before 3 months of operation .

* Treatment :**Steps**

Dissection is done till the edge of defect at the abdominal wall

Then **ONE OF THE FOLLOWING WILL BE DONE :-**

[I] Anatomical Repair (If the defect is small).

The sac is excised & the Abdominal layers are defined & closed separately

[II] Keel repair operation (If the defect is wide).

The sac is identified & dissected down to the neck, without opening the sac, it is invaginated in the Abdomen by a series of investing sutures. The edges of the defect are closed. So as, the repair if viewed in cross section. Look like the keel of the Boat.

[III] Catell's Repair (5 layers)

The sac is dissected & opened. The contents are returned to Abdomen. Then Closed by the followings .

① 1ST LAYER :

The neck of the sac is closed from inside the sac .

② 2ND LAYER :

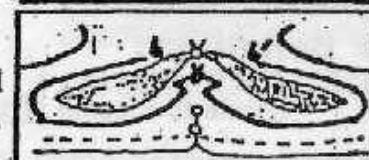
The sac is excised 2 cm distal to 1st layer & it's edges are sutured as 2 layer .

③ 3RD LAYER :

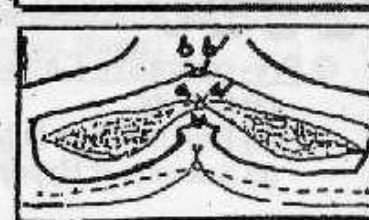
Longitudinal Incision is made in anterior rectus sheath 2 cm any from the edge of defect & then the medial flaps are sutured as 3rd layer .

④ 4TH LAYER :

The Recti muscles on either sides are approximated & sutured in the middle line as 4th layer .

⑤ 5TH LAYER :

The 2 lateral flaps of anterior rectus sheath are sutured in front of muscles in middle line as 5th layer . Finally : skin is closed over a drain .

[IV] Hernioplasty :

The Best Repair by using proline mesh .

N.B**Burst Abdomen***** Definition:**

Complete disruption of an abdominal incision in the early post-operative period

*** Aetiology:**

As incisional Hernia +

[Malnutrition, ↓ vit. C, Malignancy & Ascites]

*** Pathology:** (At 6-8th post-operative day)

It may be Complete (Separated skin) or Partial (Intact skin).

- Warning sign (**RED sign**) = Serosanguinous discharge, Soaks the dressing.
- If intestine prolapse through wound → called **Evisceration**
- If intestine doesn't prolapse through wound → called **Dehiscence**

*** Treatment:****[A] Preoperative care:**

- Cover the prolapsed bowel by a sterile dressing
- Ryle's tube suction, I.V fluid & antibiotics.
- Morphia & blood transfusion.

[B] Operative:

The protruded intestinal loops are washed with saline and returned to the abdomen, the omentum is spread over the intestine, the abdominal wall is closed as one layer by prolene (**TENSION SUTURES**) then retained at least 3 weeks.

[C] Post-operative care:

Abdominal Binder is used.

6**Rare Hernias****(A) OBTURATOR HERNIA**

- The Sac passes through the obturator foramen inside the pelvis so No External swelling So unlooked until strangulation occurs.
- Treatment: (Trans-abdominal approach)
contents are reduced, sac is excised then sutures to close the obturator canal

(B) LUMBAR HERNIA

- The sac is passed Defect in lumbar area.

It may be

① 2ry on top of lumbar incision.

② 1ry (types)

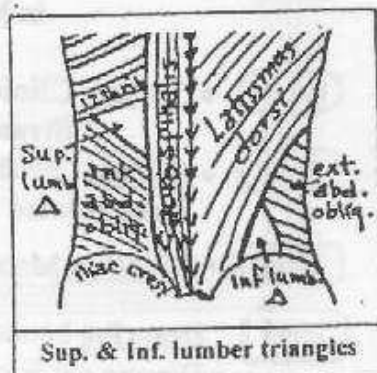
➤ Inferior lumbar Hernia :

Bounded by Iliac crest, latissimus dorsi & Ext. oblique muscle.

➤ Superior lumbar Hernia :

Bounded by last rib, sacro spinalis & int. oblique muscle.

- Treatment : Better Hernioplasty.



(C) GLUTEAL & SCIATIC HERNIA

- **Gluteal Hernia** → protrude through Greater sciatic notch.
- **Sciatic Hernia** → protrude through Lesser sciatic notch.

(D) SPIGELIAN HERNIA

- **It is Hernia** through linea semilunaris (lat. border of rectus) mid way between the symphysis pubis & umbilicus. The strangulation is very common.
- **Treatment** : Better Herniorrhaphy.



(E) DIVERGICATION OF RECTI

- **It is** a separation of Recti due to stretching of linea Alba by chronic increased Intra-abdominal pressure.e.g. with cough
- **Treatment**:
Abdominal Belt is satisfactory after dealing with the cause.



Final Written Exams



- | | | |
|-------------|--|---|
| 1990 | <ul style="list-style-type: none"> • <u>Discuss</u> Complication of Inguinal Hernia. • <u>Discuss</u> Complications of O.I.H | (15 Marks) نور ثانی
(15 Marks) |
| 1995 | <ul style="list-style-type: none"> • <u>Discuss</u> Complication of Inguinal Hernia • <u>Discuss</u> Anatomy of Inguinal Canal of Male | (15 Marks) نور ثانی
(10 Marks) |
| 1996 | <ul style="list-style-type: none"> • <u>Discuss</u> Anatomy of Inguinal Canal of Male. • <u>Discuss</u> Diagnosis of Strangulated Hernia • <u>Discuss</u> Pathology, Clinical picture & Treatment of Strangulated Inguinal Hernia | (10 Marks)
(10 Marks)
(30 Marks) نور ثانی |
| 1997 | <ul style="list-style-type: none"> • <u>Mention</u> Boundaries & Contents of Inguinal Canal in Male (Discuss Anatomy) | (10 Marks) |
| 1998 | <ul style="list-style-type: none"> • <u>Discuss</u> Clinical picture and principles of Treatment of Strangulated Hernia | (15 Marks) نور ثانی |
| 2000 | <ul style="list-style-type: none"> • <u>Discuss</u> C/P & Management of Strangulated Hernia | (10 Marks) دور ثانی |
| 2001 | <ul style="list-style-type: none"> • <u>Mention</u> Management of strangulated Hernia | (10 Marks) |
| 2003 | <ul style="list-style-type: none"> * <u>Describe</u> boundaries & content of inguinal canal • Discuss c/p & management of <u>stragulated inguinal Hernia</u> • Discuss Anatomy of inguinal canal | (9 Marks) نور ثانی
(20 Marks)
(20 Marks) |

Chapter [16]

Head & Neck Surgery

Head & Neck Surgery

"Introduction"

1- Embryology "The face developed from 5 processes"

(A) Frontonasal process : It form

- ① Forehead & Nose.
- ② Philtrum: middle line depression in upper lip .
- ③ Premaxilla : V-shaped ant. Part of upper jaw carrying 4 incisors (1ry Palate)

(B) Two Maxillary processes : one on each side

★ Fuse with frontonasal process It form

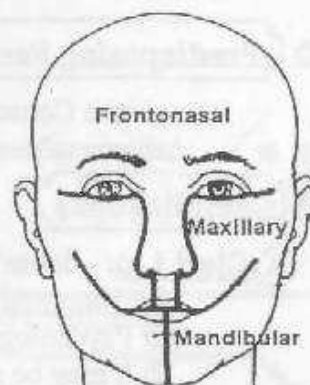
- ① Cheeks
- ② Upper lip except philtrum
- ③ Two palatine processes which fuse in the middle line to form (2ry palate)

(C) Two Mandibular processes : (one on each side)

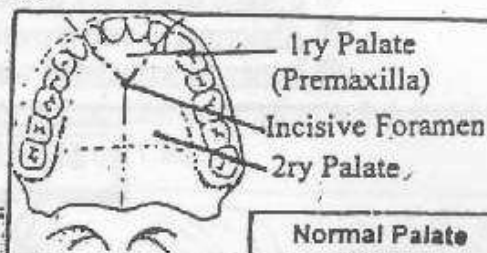
★ Fuse in middle line to form .

- ① Part of cheeks that cover the mandible .
- ② Lower lip.
- ③ Mandible.

Don't Forget



Facial Fusion Lines



Normal Palate

[A] The Palate : Is formed by fusion of

- 1ry palate (premaxilla) from frontonasal process.
- And • 2ry palate from two maxillary processes.

N.B : The Incisive foramen mark the junction of the two components of the palate

[B] The lip : (1) Upper Lip a. Philtrum : From frontonasal process.

b. Other parts: From 2 maxillary processes.

(2) Lower Lip From 2 mandibular processes.

II- Congenital Anomalies Of the Face

I) Abnormalities due to Failure of fusion :

★ Facial Clefts :

- ① Craniofacial Cleft : Rare due to failure of fusion between frontonasal and maxillary processes. (Unilateral or Bilateral).

② Cleft Lip

③ Cleft palate:

[See Below] →

★ Macrostomia

★ Pre-auricular sinus

II) Abnormalities due to Excessive fusion.

★ Narrow palpebral fissures.

★ Microstomia.

III) Dermoid cyst

I Cleft Lip & Cleft Palate

I- Predisposing Factors & Complications

* Predisposing Factors

e.g. +ve Consanguinity, Prenatal exposure to viral infections or drugs as Alcohol, Anticonvulsants etc...

* Complications

(A) **Cleft Lip:** doesn't interfere with suckling, but may be associated with

- ① Abnormal Teeth growth.
- ② Psychological upset of the parents .
- ③ It may be associated with cleft palate.

(B) **Cleft Palate :**

- ① Impairment of normal sucking , due to inability to create a - ve intra-oral pressure.
- ② Regurgitation predisposes to Aspiration pneumonia .
- ③ Recurrent Otitis Media → Hearing Loss
- ④ Speech defect try to Hearing loss or Nasal Tone.
- ⑤ Abnormal Teeth growth .
- ⑥ It may be associated with cleft lip

III- Local Examination

(A) Cleft (Hare) Lip



Normal

* Types

(I) Upper (Hare) Lip :

1. Unilateral or Bilateral Cleft lip :

e.g. **Unilateral (85%)** : Due to failure of between maxillary process on one side forming (lateral part of the lip) and frontonasal process on other side forming (Philtrum)

2. Partial (Incomplete) or Complete : Whether the cleft extends in the floor of the nostril or not.

3. Simple or Alveolar : i.e. Associated with ununited premaxilla or not.

(II) Lower (Hare) lip : (Very Rare) Median type.

Due to failure between the two mandibular processes

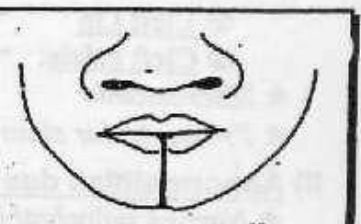


Unilateral

Bilateral

Incomplete

Complete



Cleft lower lip

❖ **Investigation** U/S In utero during ante-natal care

❖ **Treatment** [Plastic Operative Repair]

• **Aim of Treatment:** To improve appearance and to prevent complications

• **Timing of Repair:**

10 gm% (Hb), 10 weeks (age) & 10 pound (weight)

• **Principles**

- ① Paring the edges.
- ② Releasing incision in the gingivo-labial sulcus to have lax flaps.
- ③ Symmetry of lip without vertical shortening with minimal scarring. Using **Z-plasty** →



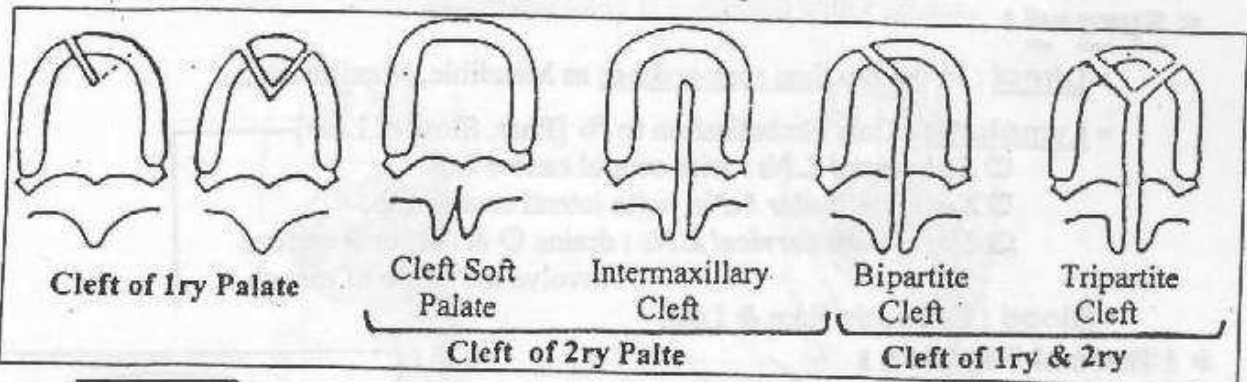
- ④ Suture in (3 layers) of lip [Skin, Muscle & Mucous membrane]

N.B : ① Incomplete hare lip should be transformed into complete
 ② If Cleft lip is associated with a cleft palate, Lip is repaired first

❖ Cleft Palate

❖ **Types**

- ① Cleft of the 1ry palate : Unilateral or Bilateral.
- ② Cleft of the 2ry palate in isolation : Cleft Soft, Palate, Inter-maxillary Cleft & Bifid Uvula.
- ③ Cleft of the 1ry and 2ry palates : Bipartite & Tripartite Clefts.



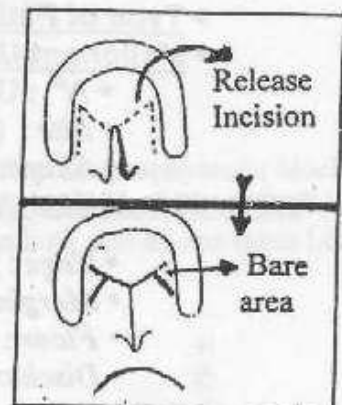
❖ **Treatment** [Plastic Operative Repair]

- **Aim** : To achieve adequate speech and dentition.
- **Timing of repair** : At the age of 1-1.5 year before phonation
- **Principles** :

- ① Paring of the edges.
- ② Releasing incisions of the mucoperiosteum creating lax flaps
- ③ Fracture of head of hamulus to relax the tensor palati muscle.
- ④ Suture in (3 layers) [Nasal mucosa, Muscle layer then Oral mucosa].

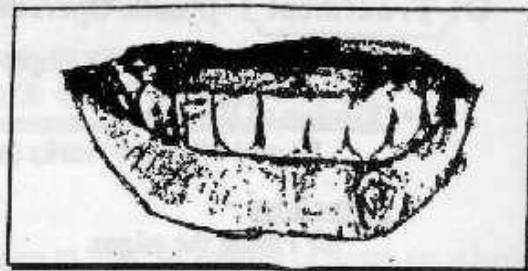
N.B. : Pharyngoplasty : Repair of nasopharyngeal sphincters indicated in nasopharyngeal incompetence.

Post-operative Speech Therapy



*** Incidence :**

- Age: > 60 years
- Sex: Male > Female
- Smokers > Non smokers

*** Predisposing factors :**

- Chronic Irritations as 5S (Spirits, Spices, Smoking, Sepsis & S)
- Leukoplakia
- Benign Tumors as Squamous cell Papilloma.

*** Pathology :**

- Site ① The upper lip **5%**
- ② The Angle of mouth **2%**
- ③ The Lower lip **93%**

▪ NIE picture :

- ① Malignant ulcer.
- ② Malignant Nodule.
- ③ Malignant Fissure.



N.B. Diffuse Infiltrating Type = Woody Lip.

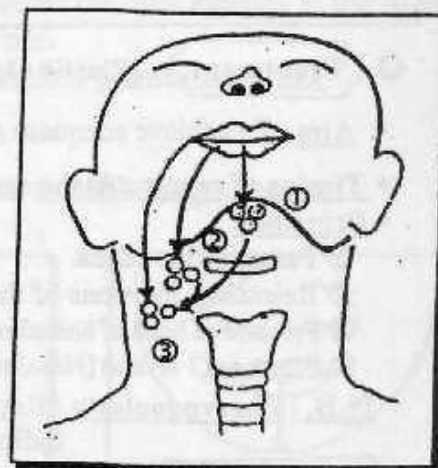
- Microscopic picture: Squamous Cell Carcinoma.

*** Spread :**

- Direct : In the Lip then surroundings as Mandible, Maxilla etc...
- Lymphatic : Only Embolisation to ♢ [Rare, Slow & Late]
 - ① Submental LNs : with central cancer Lip.
 - ② Submandibular LNs: with lateral cancer Lip.
 - ③ Upper deep cervical LNs : drains ① & ② or if cancer involve the angle of mouth.
- Blood : Extremely Rare & Late.

*** Clinical Picture :**

- Type of Patient : Elderly Male .
- Malignant Ulcer : "The commonest"
 - N° : Usually single
 - Site : (see above).
 - Shape: Variable .
 - Size : Variable.
 - Edge : Raised & Everted
 - Margin : Indurated
 - Floor : Necrotic Floor .
 - Discharge : Bloody discharge .
- Base : Indurated.
- Involved L.Ns are Stony Hard, Painless & 1st mobile but later fixed.



* Complication :

- Bleeding or Infection .
- Dysphagia & Dysarthria .
- Upper Respiratory Tract Infection from inhaled necrotic tissue.

* Investigation :

Excisional biopsy (if small) or Incisional biopsy (if whole lip)

* Treatment :

Ⓐ Treatment of 1ry Lesion

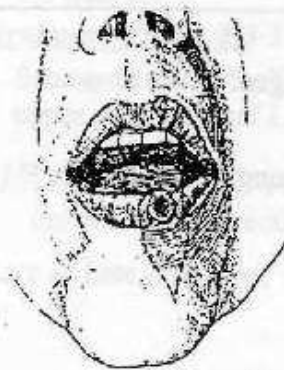
[I] Irradiation

N.B: Radium Needle is used for buccal lesion



[II] Surgical Excision :

- Indications
 - ① Small lesion
 - ② Cancer on top of §
 - ③ Others :
 - a. *Recurrent lesion* after irradiation
 - b. *Resistant lesion* to irradiation .
 - c. *Lesion infiltrating Bone* .
- Technique
 - ① Excision with safety margin 1.5 cm all around
 - ② Plastic Reconstruction of the Lip.
 - ③ If Mandible is involved → Central Hemi-mandibulectomy is combined with excision.



Wedge excision of carcinoma of the lip

Ⓑ Treatment of L.N.s

It may be due to 2ry infections SO wait for one month i.e. No place for prophylactic block dissection . After that period IF they are due to metastasis "Supra-hyoid Block Dissection" is done be removal of submandibular & upper deep cervical L.Ns on both side as one mass i.e. [en Block]

* Prognosis :

- ★ Extremely Favorable in early cases é out L.Ns metastasis .

3 Carcinoma of The Tongue

* Incidence :

- Age : > 60 years .
- Sex : Male > Female .
- Smokers > Non smokers.



(م) * Predisposing Factors: (Precancerous Lesions)

- ① Chronic Irritations, as 5S (Spirits, Spices, Smoking, Sepsis, & \$)
- ② Benign Tumors, as Squamous cell Papilloma.
- ③ Leukoplakia. ↻

→ Definition :

It is a case of Hyperkeratosis & possibly dysplasia

→ Pathology :

Circumscribed white plaque, involve wide areas of oral mucosa.

④ Erythroplakia : ↻

→ Definition :

It is a case of mucosal Atrophy.

→ Pathology :

Irregular Reddish plaque, involve small area of oral mucosa.

⑤ Chronic superficial glossitis: ↻

→ Definition :

It is a case of chronic Irritation of tongue.

→ Pathology :

- Site : It affects the anterior 2/3 of the tongue.

• N/E :

It may be :

- beefy glazed tongue.

Or ○ Leukoplakia.

Or ○ Fissuring.

Finally ○ Carcinoma.

• M/E :

It may be

- Hyperkeratosis.

Then ○ Acanthosis proliferation of prickle cell layer

Then ○ Basal cell layer.

Finally ○ Thickened & fibrosed dermis.

→ Treatment :

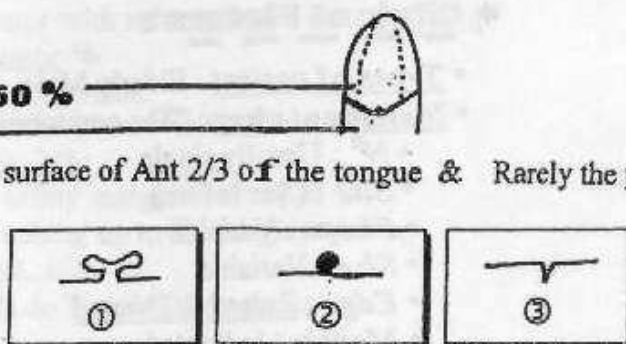
- ① Treatment of the cause of irritation.
- ② Non irritant diet & Mouthwash
- ③ Excised and biopsied if localized.

* Pathology :

- **Site** : ① Lateral margin of Ant. 2/3 = **50 %**
 ② Post. 1/3 = **20 %**
 ③ Less common ventral & dorsal surface of Ant 2/3 of the tongue & Rarely the tip of Tongue.

▪ N/E picture:

- ① Malignant Ulcer
- ② Malignant Nodule
- ③ Malignant Fissure.



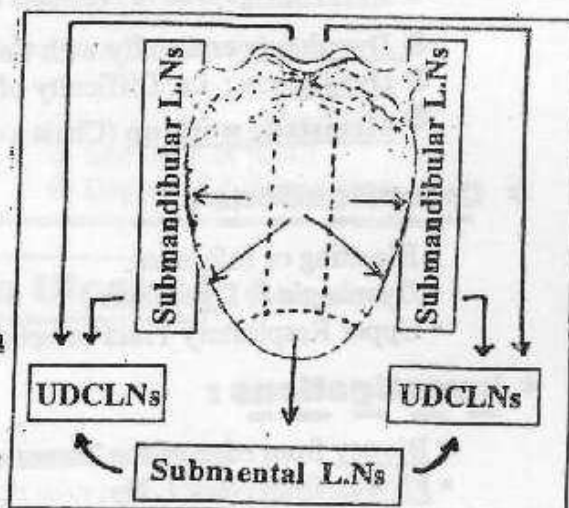
N.B : Diffuse Infiltrating Type = Woody Tongue.

- Microscopic picture: Squamous Cell Carcinoma.

* Spread :

- Direct : In the Tongue then surroundings as mandible, gums etc..
- Lymphatic : Both Embolisation & Permeation [Common, Rapid & Early]

- ① Tip : Spread to submental L.Ns Then to upper deep cervical L.Ns on both sides.
- ② Lateral margin of Ant. 2/3 : To the Ipsilateral submandibular L.Ns. Then to Ipsilateral upper deep cervical L.Ns.
- ③ Central part of Ant. 2/3 To both Submandibular L.Ns Then to both upper deep cervical L.Ns.
- ④ Post 1/3 of Tongue : To upper deep cervical L.Ns directly



- Blood : Rare & Late if cancer (post 1/3)

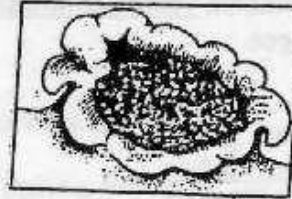
* Staging :

T = <u>Tumor</u>	N = <u>Lymph Nodes</u>	M = <u>Metastasis</u>
T _{is} = Carcinoma in situ	N ₀ = NO Evidence of L.Ns	M ₀ = NO Metastasis
T ₀ = NO Evidence of Tumor	N ₁ = L.Ns < 3 cm	M ₁ = Distant Metastasis
T ₁ = < 2 cm	N _{2a} = Ipsilateral & <u>single</u> 3-6 cm	
T ₂ = 2 - 4 cm	N _{2b} = Ipsilateral & <u>Multiple</u> 3-6 cm	
T ₃ = > 4 cm	N _{2c} = Bilateral 3-6 cm	
T ₄ = Base involvement	N ₃ = L.Ns > 6 cm.	

* Clinical Picture :

- Types of patient : Elderly Male
- Malignant ulcer : "The commonest"

- N^o : Usually single
- Site : (See before)
- Shape : Variable
- Size : Variable
- Edge : Raised & Everted
- Margin : Indurated .
- Floor : Necrotic Floor .
- Discharge : Bloody discharge .



- ★ Base : Indurated .

- Involved L.Ns are Stony Hard, Painless & 1st mobile but later fixed.

2/50

Late presentation As →

- ① Pain : Localized to Tongue or referred to ear through the auriculo – temporal n. of the mandible .
- ② Profuse Salivation : which may be bloody stained.
- ③ Fetor Oris : Due to Necrosis & Infection .
- ④ Dysphagia especially with Cancer post. 1/3 of Tongue.
- ⑤ Dysarthria : i.e. Difficulty of speech.
- ⑥ Metastatic work up (Chest x-ray, Bone scan, CT brain & liver U/S)

* Complications :

- Bleeding or Infection .
- Dysphagia & Dysarthria .
- Upper Respiratory Tract Infection from inhaled necrotic tissues .

* Investigations :

- Biopsy from edge of the Tumor .
- FNAC from Neck L.Ns .
- Metastatic work up .

* Treatment :

① Treatment of 1ry lesion

[I] Irradiation (T₁ & T₂)

N.B : Radium Needle is used

[II] Surgical Excision

- Indications: ① Small Tumor
- ② Cancer on top of S.
- ③ Others :
 - a. Recurrent lesion after irradiation
 - b. Resistant lesion to irradiation .
 - c. Lesion infiltrating bone.

- **Technique** : Excision of tumor with safety margin but according to the site of tumor →

[A] Carcinoma of Tip of tongue

we will do partial glossectomy

[B] Carcinoma of Ant. 2/3 :

Excision with safety margin (1.5cm) &

may reaching up to Hemi-glossectomy.

[C] Carcinoma of Post. 1/3 :

We will do Total Glossectomy.

N.B. : IF Mandible is involved → Commando - operation is done
Combined mandibulectomy And Neck Dissection Operation.

then the defect closed by myocutaneous flap (e.g. pectoralis major) + Rib graft from (contralateral 5th rib)

(B) Treatment of L.Ns

Whether L.Ns are palpable or not → **Total Block Dissection** is done as Nodal involvement is early & Common.

(C) Palliative treatment : (for inoperable patient)

By ① Palliative resection.

② Radiotherapy & chemotherapy.

③ Analgesic, naso-gastric feeding or tracheostomy may be required.

* Prognosis : 5 years survival rate

Depending on ① Presence of L.Ns or not.

② T.N.M staging.

③ Site (Ant. or post.)

④ Degree of differentiation.

4

Tongue Ulcers

(مهم جدا)

[A] Traumatic ulcers :

① Eraenal (Post-pertussis) ulcer :

- It is usually affect children with whooping cough.
- It is due to violent attacks of cough with trauma to frnulum.
- It is usually small, rounded with sloping edge & soft base.

② Post-epileptic ulcer :

It is due to trauma (bitting) of the tongue during epileptic fit.

③ Dental ulcer (See table)

[B] Inflammatory ulcers :

(I) Acute : ① Despeptic ulcer (See table)

② Herptic ulcer : multiple, painless with children.

③ Lichen planus : Auto immune affects the skin & oral mucosa
 → ulcers.

(II) Chronic : ① T.B. ulcer (See table).

② S. ulcer (See table).

[C] Malignant ulcer : See before

- The most **serious** is malignant ulcer e.g. Cancer Tongue.
- The most **common** are 1. Dyspeptic ulcer.
2. Dental ulcer.
- The **uncommon** are 1. T.B.
2. S.

	Dyspeptic Ulcer	Dental Ulcer
★ Causes	• GIT troubles & follows influenza	• Sharp Tooth.
★ Description • Number • Site • Shape • Size	• <u>Multiple.</u>  • <u>Tip & side</u> of tongue or buccal mucosa. • <u>Rounded</u> • <u>Very small.</u>	• Usually <u>single.</u>  • <u>Side</u> of tongue & opposite to causative tooth. • <u>Oval</u> • <u>Moderate.</u>
• Edge • Margin • Floor • Discharge	• <u>Sloping.</u>  • <u>Hyperaemic</u> • <u>Yellowish</u> • <u>No.</u>	• <u>Punched out</u>  • <u>Hyperaemic</u> • <u>Unhealthy granulations</u> • <u>Blood & pus</u>
➤ Base	• <u>Soft</u>	• <u>Indurated</u>
➤ Regional L.Ns	• <u>Not present</u>	• <u>Firm & Tender</u>
★ Treatment	• Treat the cause + painting the ulcer by gentian violet	• Treat the cause i.e removal of septic tooth.

	T.B Ulcer	S Ulcer
★ Causes	• Open pulmonary T.B.	• 3ry stage [Gumma]
★ Description • Number • Site • Shape • Size	• <u>Multiple.</u>  • <u>Tip & base</u> of the Tongue. • <u>Rounded</u> • <u>Small.</u>	• <u>Single.</u>  • <u>Dorsum</u> of the Tongue (At the middle line). • <u>Oval</u> • <u>Large.</u>
• Edge • Margin • Floor • Discharge	• <u>Undermined.</u>  • <u>Bluish (cyanotic)</u> • <u>Casseation</u> • <u>Serous</u>	• <u>Punched out</u>  • <u>Leathery sloughs</u> • <u>Scanty</u>
➤ Base	• <u>Soft</u>	• <u>Indurated</u>
➤ Regional L.Ns	• <u>Matted L.Ns</u>	• <u>-----</u>
★ Treatment	• <u>General</u>: Anti-T.B. drugs • <u>Local</u>: Improve Oral Hygiene	• <u>General</u>: Anti-syphilitic drugs • <u>Local</u>: Improve Oral Hygiene.

5

Cystic Swellings of the Floor of the Mouth**[1] Ranula** (Ranula = frog) (The commonest)

★ **Aetiology** : It is a retention cyst or extravasation cyst of sublingual gland.

★ **Pathology** :

- ◆ **Site** : In one side of the floor of the mouth pushing the tongue to the other side (simple Ranula). It may dissect its way behind the posterior border of the mylohyoid muscle to appear in the neck (submandibular region) (Plunging or dissecting Ranula).
- ◆ **Composition** :
 - It is lined with columnar epith.
 - It contains jelly like material rich in mucin no salivary enzymes.



★ **Clinical Picture** :

- Usually in infancy or early childhood.
- Bluish translucent large cystic swelling pushing the tongue to one side and it may cross the midline and become constricted by the fraenum linguae giving an hourglass appearance.
- It may cause dysphagia, dysarthria & dyspnea.

★ **Treatment** :

- Simple Ranula : Surgical excision is very difficult Marsupialization is the treatment of choice by derroofing of the cyst and suturing the wall to the oral mucosa.
- Plunging Ranula : may need cervical incision for its dissection.

[2] Sublingual dermoid :

★ **Aetiology** :

Sequestered dermoid during fusion of epithelium on both halves of the tongue.

★ **Pathology** : There are two varieties :-

- ◆ Supramylohyoid type :
 - Appears in the floor of the mouth.
- ◆ Inframylolohyoid type :
 - Appears in the anterior triangle of the neck. It may be median in the submental Δ below the chin (Bouble chin)

★ **Clinical Picture :**

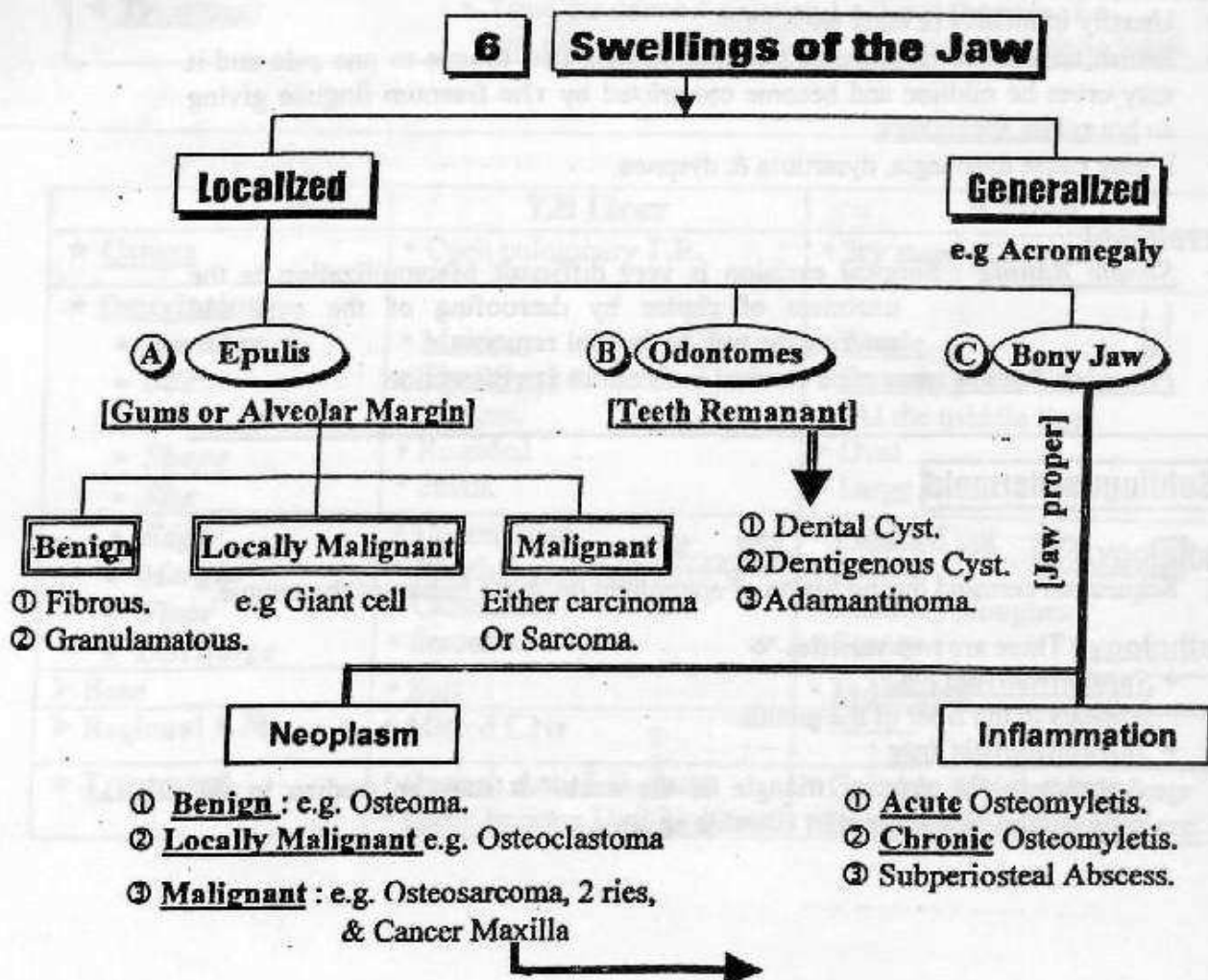
- Supramyohyoid type : It may cause dysphagia, dysarthria & dyspnea.
- Inframyoohyoid type : Swelling in the submental or digastric triangle it gets more prominent during deglutition i.e. contraction of mylohyoid muscle.

★ **Treatment** : Surgical excision.**[3] Mucous retention cyst :**

- It is A Retention cyst of buccal mucous gland.
- It is small bluish translucent globular cyst anywhere in the buccal cavity.
- The treatment is excision under local anaesthesia.

[4] Suprahyoid thyroglossal cyst**[5] Cystic tumours :**

e.g. Haemangioma, Lymphangioma.



Carcinoma of Maxillary Antrum

* Predisposing factors :

Multiple maxillary polyps & Chronic sinusitis.

* Incidence:

[Male > Female & 40 years].

* Pathology:

- ◆ Site : At maxillary antrum.
- ◆ N/E : It invades the surrounding structure by a papillary growth & rarely malignant ulcer.
- ◆ M/P : - Columnar cell carcinoma from maxillary antrum.
Or - Squamous cell carcinoma from hard palate organs.

* Spread :

- ◆ Direct : To the surroundings.
- ◆ Lymphatics : to upper deep cervical LNs.
- ◆ Blood : Rare & Late.

* Clinical picture:

- ◆ Early :
Pain & chronic sinusitis in old patient Not respond to treatment.
- ◆ Late :
[Depends on which wall of the Maxillary Antrum is Involved]
 - Medial wall of Antrum : Unilateral Nasal Obstruction.
 - Roof of the Antrum : Unilateral Proptosis & Diplopia.
 - Floor of the Antrum : Bulging in the roof of oral cavity.
 - Antro-lateral wall : Bulging & Swelling of the cheek.
 - Post wall of Antrum : Encoraches on the Naso-pharynx → change of voice & Difficulty of breathings.

* Investigations:

- ① X-ray : Opacity & ↑ size of maxillary antrum.
- ② CT scan & MRI : Diagnostic.
- ③ Biopsy : Sure method.

* Treatment:

[A] Operable:

Total maxillectomy ± total block neck dissection + plastic repair.

[B] Inoperable:

Intra-cavity radiation by radium needle.

A An Epulis

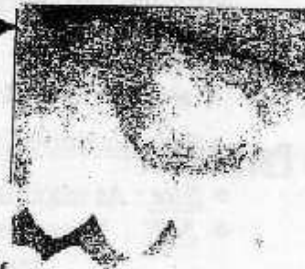
An Epulis = Mass riding over gums

I Benign Epulides

① Fibrous Epulis

* Pathology :

- Site : Between 2 tooth.
- N/E picture : Arising from the outer fibrous layer of perisoteum.
- Microscopic picture : Fibrous tissue with Spindle cells & Plasma cells.



* Clinical Picture :

The swelling is painless, well defined edge, pedunculated shape, Firm in consistency, pinkish in colour & covered with intact mucous membrane.

* Treatment :

Excision of Tumor with adjacent Tooth + Removal of wedge of bone with it's mucoperiosteum.

② Granulomatous Epulis

* Pathology :

- Site : Around a Carious Tooth.
- N/E picture : Mass of Granulation tissue.
- Microscopic picture : Granulation Tissue (Capillaries & Fibroblasts).

* Clinical Picture :

The Granulation Tissue may be 2

- ★ Healthy : Pink, Painless, doesn't bleed or ooze easily.
- ★ Unhealthy : Yellow, Painful, bleed or ooze easily.

* Treatment :

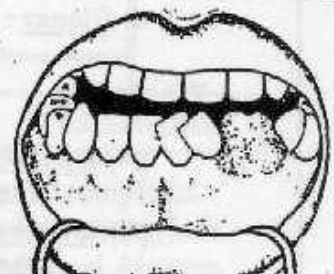
Extraction of the Carious Tooth + Curretage of unhealthy G.T.

II Locally Malignant Epulides

[Giant cell (Myeloid) Epulis]

* Pathology :

- Site : Undergums [Lower jaw > Upper jaw].
- N/E picture : Arising from osteoclastic layer of periosteum.
- Microscopic picture : Multinucleated giant cells in a matrix of fibrous tissue.



N.B. : It is Not malignant but locally malignant

* Clinical Picture :

The swelling is painless, Sessile in shape, soft in consistency, violot in colour from vascularity So ulceration leads to severe Hge.

* Treatment :

Wide Excision with part of bone which carrying the epulis.

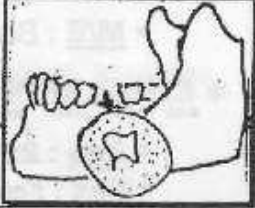


III Malignant Epulides

- Carcinoma : Squamous cell Ca. of gums.
- Sarcoma : Parosteal fibrosarcoma or periosteum of mandible.
- Treatment : Hemimandibectomy + Rib graft (contralateral 5th)

B Odontomes

These are cysts related to teeth Remenant

	① <u>Dental cyst</u>	② <u>Dentigerous cyst</u>
* <u>Incidence</u> : • <u>Age</u> : • <u>Sex</u> : • <u>Site</u> :	• Old • Male > Female • Upper Jaw 	• Adult & young • Male > Female • Lower Jaw 
* <u>Aetiology</u>	• Chronic infected root of a tooth.	• <u>Non erupted</u> permanent tooth.
* <u>Pathology</u> • <u>Mechanism</u> • <u>N/E</u> • <u>M/E</u>	• Chronic Infection → stimulation of epithelial debris of the <u>Malassez</u> → proliferation → Mass which undergo central degeneration → <u>Cyst</u> . • Small <u>unilocular</u> cyst. Which is slowly growing → Expansion of Jaw <u>on both sides Equally</u> . • <u>Lined by</u> squamous epith. & <u>Contains</u> mucoid fluid rich in cholesterol.	• Cystic degeneration of a dental follicle → <u>Cyst</u> . • Expanded outer (thin) table of the Jaw <u>only</u> . • <u>Lined by</u> squamous epith. & <u>Contains</u> a missed tooth at viscid fluid.
* <u>C/P</u>	• Painless, <u>well</u> defined mass related to <u>infected</u> tooth at upper jaw	• Painless, <u>Ill</u> defined mass related to <u>missed</u> tooth at lower jaw.
* <u>Investigation</u> :	• <u>[X-ray]</u> Shows ☞ Radiolucent area at upper jaw	• <u>[X-ray]</u> Shows ☞ Cyst with tooth inside it

***Treatment:**

★ Dental Cyst : Extraction of the affected tooth & Excision of the wall of the cyst.

★ Dentigerous Cyst : Removal of the roof of the cyst and lining epithelium with missed Tooth.

③ **Adamantinoma** "Eves Tumor"

[Ameloblastoma-Multilocular cystic disease of the Jaw]

***Origin :** "Locally Malignant Tumor"

Arising from (Ameloblastoma) = Para-dental cells of Malassez.

***Pathology :**

- Site : Starts at angle of mandible & grows slowly in both Vertical & Horizontal directions.
- N/E : ① Pink or white in colour & Well encapsulated.
② Solid mass with cystic areas & Almost equal lobulation.
③ Fibrous Tissue Trabeculation in between.
- M/E : Basal Cell Carcinoma

***Clinical Picture :**

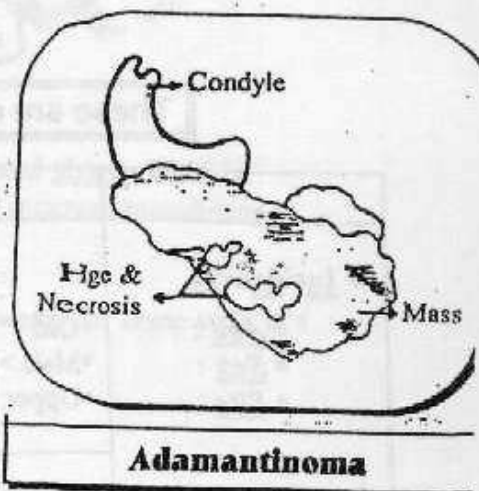
- Age : 20 - 40 years.
- Sex : Female > Male.
- Presentation :

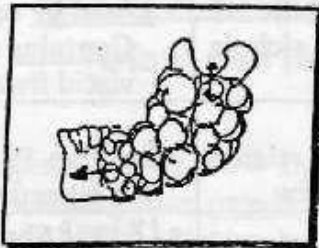
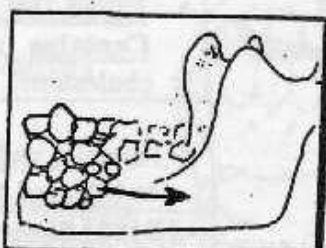
(A) Symptoms

Painless, lobulated, slowly growing swelling in lower jaw.

(B) Signs

- ① Expansion with intact overlying skin & mucus membrane
- ② Egg shell crackling sensation if enlarged with No L.Ns.
- ③ Later on a) Ulceration & Infection
b) Bleeding from mucus membrane.
c) Falling of Teeth



D.D. :	Adamantinoma "Eves Tumor"	Osteoclastoma "Giant Cell Tumor"
		
*Site : *Growth *Shape	• <u>Angle</u> of Mandible. • <u>Both</u> Horizontal & vertical. • Almost <u>Equal</u> Lobulation &	• <u>Symphysis</u> Menti • <u>Only</u> Horizontal • <u>Unequal</u> Lobulation & Expanded

*** Investigation :**

[X-ray] shows Fine soap bubbles appearance related to angle of mandible.

*** Treatment :**

Resection of tumor bearing segment of the jaw
i.e. Hemi-mandibulectomy then bone graft.

7**Salivary Gland Diseases**

- I **Inflammation** : e.g. Acute Parotitis = Acute sialadenitis.
- II **Salivary Calculi** (Stones). = Chronic sialadenitis.
- III **Salivary Tumors** : Benign & Malignant

**I****Acute Parotitis****Acute Sialadenitis***** Aetiology :**

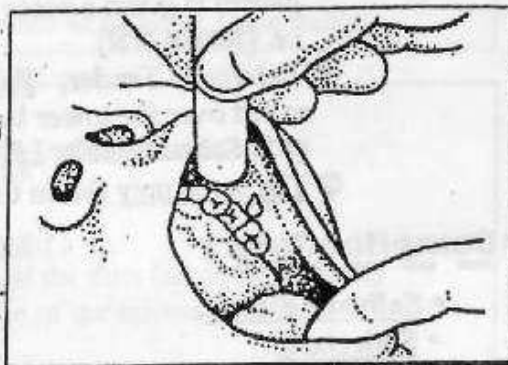
- **Organism** : Staph. Aureus. Less common Strept., Pneumococci etc..
- **Predisposing Factors** : ① Reduced saliva with fasting or medications with Atropine.
② Lack of Oral hygiene.
③ Obstruction of duct e.g. F.B or Stones
- **Mode of Infection** : Along the duct from the mouth
i.e. Retrograde infection or Blood borne infection.

*** Clinical picture :****(A) General**

Toxic Symptoms (Fever, Headache,etc)

(B) Local

- ① Painful swelling at parotid region.
- ② Oedematous swelling but fluctuation is later.
- ③ The opening of the duct is red, raised with possibility of purulent discharge →

*** Treatment :**

- **Prophylactic** : Correct Dehydration & Care of Oral hygiene
- **In Early Cases** : A.B therapy
- **In Fulminating Cases** : i.e. **Parotid Abscess**

[Don't wait for Fluctuation] So →

- ① A vertical skin incision is done in front of Ear.

Then ② The Deep fascia is incised Transversally To avoid injury of Facial nerve & its branches.

Then ③ A sinus Forceps is introduced closed and then opened to drain the pus
i.e. [Hilton's Method].



II

Salivary Calculi

Chronic Sialadenitis

* Incidence :

The Submandibular glands to Parotid gland ratio is **50 : 1**

Why? because ① The Submandibular secretion is more viscid.

② The Submandibular duct lies in the floor of mouth so liable to be blocked by food particles.

③ The Submandibular gland drainage is inadequate as it ascends upwards.

* Pathogenesis :

Obstruction → Stasis → Infection → Change of pH of Saliva.

* Pathology : [stone]

▪ The Site : The stones impacted inside the gland or in the duct.

▪ The Number : may be single or multiple.

▪ The Nature composed of Calcium, Magnesium phosphate & Carbonate.

* Clinical Picture :

(A) Symptoms

Attacks of pain at submandibular swelling during meal.

(B) Signs

① Pain and size of gland is increased when patient is given a piece of lemon to suck i.e. [Lemon Test].

② Enlarged, Tender, Palpable and cannot rolled over the lower border of the mandible (D.D. Submandibular L.Ns)

③ The stone may felt in the duct →



* Complications :

▪ Salivary Fistula.

▪ Sialectasis

i.e. Dilated duct.

* Investigations :

(A) Plain x-ray : Stones are 100% Radio-opaque. →

(B) Sialography : Dilated ducts + Filling defect of stone.



* Treatment : "According to site of impacted stone"

▪ Stone at orifice : Removed through Meatotomy.

▪ Stone in the duct : Cutting Directly over it.

▪ Stone in the Gland : Total Excision of the gland.
i.e. Sialadenectomy.



Salivary Fistula :

- * **Definition :** - It is a fistula of salivary gland or duct.
- It may be (single or multiple).

- * **Types :** ① **Internal :** opens in the mucus membrane.
② **External :** opens in the skin.

* **Aetiology :**

[A] **Trumatic :** Usually operative or penetrating facial injuries.

[B] **Inflammatory :**

a. Acute Abscess → Rupture.

b. Chronic Inflammation with stone.

[C] **Neoplastic :** Malignant tumors infiltrating the skin.

* **G/P :** Watery discharge from ectopic site over the gland.

* **Investigations :** Sialogram .

* **D.D. :**

* From parotid e.g pre-auricular sinus.

* From submandibular : e.g. Branchial Fistula.

* **Treatment :**

[A] **If submandibular (Duct or Gland)**

Submandibular sialadenectomy.

[B] **If Parotid Gland :**

Superficial conservative paratidectomy.

[C] **If parotid Duct :**

Excision & end to end anastomosis or mucosal flap repair.



Other Types of Sialadenitis :

[A] **Recurrent subacute and chronic sialadenitis :**

- Usually caused by partial obstruction of the duct (stone or stricture) Sialectasis. Or Auto-immune disease of the salivary glands.

[B] **Viral parotitis :**

- Due to mumps virus.
- Causes bilateral, painful enlargement of the parotids with fever. Usually occurs in children. Self-limiting.

[C] **Endemic parotitis :** Bilateral painless parotid enlargement occurs in

- ① Chronic parasitic infestation (Anclystoma) and
- ② Protein malnutrition.

III Salivary Tumors

Classifications

A Benign Tumors	B Malignant Tumors
① <u>Pleomorphic Adenoma</u> (Mixed Tumor) ② <u>Monomorphic Adenoma</u> (Warthin's tumor = Adenolymphoma) ③ <u>Oxyphil Adenoma</u> (Oncocytoma) ④ <u>Adenocystic Lymphoma</u> .	① Muco-epidermoid Carcinoma. ② Adeno-cystic Carcinoma. = Cylindroma. ③ Acinic Cell Carcinoma. ④ Miscellaneous Adeno-carcinoma.

A Benign Tumors

1 Pleomorphic Adenoma

[Mixed Parotid Tumor]

* Incidence :

- Age : At 4th decades of life.
- The commonest Tumor of salivary gland.
- Common with parotid > submandibular gland.

* Pathology :

- Site : Usually superficial part.
- N/E : Lobulated, Well encapsulated Tumor.
- M/E : Epithelial cells arranged in sheets with
Blue stroma (thought to be Cartilaginous).

* Spread :

Strands of Tumor tend to penetrate the Capsule.
So there is high rate of recurrency

* Clinical Picture :

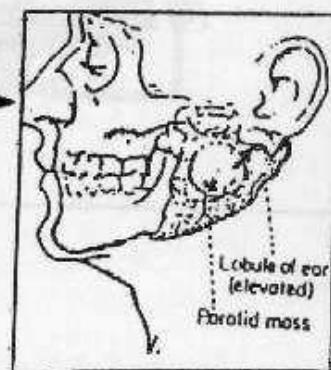
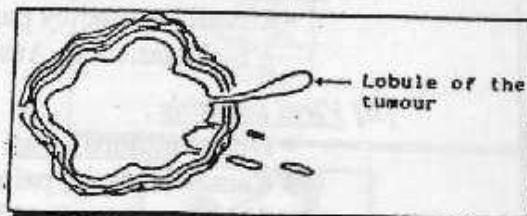
A Symptoms

Unilateral, Painless & Well defined mass.

B Signs

- ① The swelling may elevated lobule of Ear and consistency is Firm (Never Hard)
- ② Facial nerve is not affected & the Superficial Temporal artery pulsation is felt.
- ③ If affect the deep part → pushing the Tonsil medially.

N.B: It turns into malignancy in 3%



* D.D.:(A) DD of Parotid Swellings[I] Skin & S.C Tissue :

- ① Sebaceous cyst.
- ② Lipoma.
- ③ Haemangioma.
- ④ Neurofibroma
- ⑤ Lymphangioma.
- ⑥ Warts, boil or keloids.
- ⑦ Haematoma or Abscess.
- ⑧ Pre-auricular dermoid cyst.
- ⑨ Papilloma.
- ⑩ Melanoma.

[II] Parotid gland diseases :

e.g. Inflammations, stones, Tumors etc...

- [III] Others :
- ① Pre-auricular or Parotid L.Ns.
 - ② Mandibular Tumor.
 - ③ Hypertrophy of Masseter Muscle.

(B) DD of Submandibular Swellings[I] Skin & S.C Tissue : As before.[II] Submandibular gland : As before.

- [III] Others :
- ① Submandibular L.Ns.
 - ② Mandibular Tumor.

* Investigations: FNAC is usually enough to reach the diagnose.

* Treatment: [Enucleation of pleomorphic adenoma is easy but followed by High rate of recurrency] So
The Standard Operations are ⇨

I- Conservative Superficial Parotidectomy :

Removal of superficial part of gland with preservation of facial nerve.

II- Conservative Total Parotidectomy :

As above + Removal of deep part.

III- Submandibular Sialadectomy : If Affect submandibular gland.

2

Monomorphic Adenoma

[Adenolymphoma = Warthins Tumor]

[It is an Epithelial Tumour]* Pathology :

- Site : Superficial part only.
- N/E : Multiple Cystic & Variable in size.
- M/E : Epithelial cells spaces with lymphoid stroma.

* Clinical picture: Same as pleomorphic but cystic in consistency & Not raising the ear lobule.

* Treatment: Conservative Superficial Parotidectomy.



Malignant Tumor

* Incidence :

- Age : Elderly
- Sex : Female > Male
- Parotid gland > Submandibular gland

* Predisposing Factors :

De novo or on Top of Mixed Parotid Tumor (3%)

Pathology :

- Site : Superficial or Deep parts
- N/E : Infiltrating, Non capsulated mass with area of Haemorrhage & Necrosis
- M/E : "Pathological Types"
 - ① Muco-epidermoid Carcinoma :
 - Arises from epithelial lining ducts of salivary gland.
 - It is rare but common with Children.
 - Treated by Removal of gland + Radiotherapy.
 - ② Adeno-cystic Carcinoma (Cylindroma)
 - ③ Acinic cells Carcinoma
 - ④ Miscellaneous Adenocarcinoma



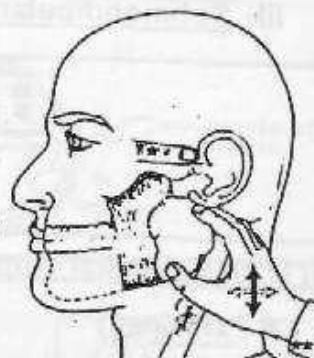
* Spread :

- Direct : To surroundings e.g. Mandible, Masseter etc....
- Lymphatic : Parotid L.Ns → Submandibular L.Ns → Upper deep cervical L.Ns.
- Blood : Late & Rare to lung, bone etc....

* Clinical Picture :

* Salivary gland swelling showing "Criteria of Malignancy"

- ① Pain which may referred to ear
- ② Hard in consistency
- ③ Irregular surface with ill defined edge
- ④ Rapid rate of growth
- ⑤ Infiltration of skin, muscles, vessels & Nerves



N.B. : Facial nerve is affected with Parotid Carcinoma but Hypoglossal & Lingual nerves are affected with Submandibular Carcinoma.

⑥ Enlarged Stony Hard L.Ns 1st mobile then fixed

* D.D : (See before)

*** Complications :**

- Ulceration & Infection
- Haemorrhage
- Facial Nerve palsy with parotid tumors

*** Investigations :** (Not Routine)

- Metastatic work up (Chest x-ray, Bone scan, CT brain & liver U/S)
- Isotopic scan with Tc⁹⁹ → Cold spots
- FNABC : Fine Needle Aspiration Biopsy Cytology.

*** Treatment :** (According to ⚡)**(A) Operable****[I] Cancer Parotid Gland: Total Parotidectomy + Total Block Dissection.**

N.B. : ① The Facial nerve is sacrificed but may be grafted by great auricular nerve

② Part of ramus of mandible may be excised if infiltrated.

③ Post-operative persistent facial paralysis :
we will do either **A** or **B**.

(A) Transposition of Hypoglossal nerve then anastomosing it to the peripheral branches of facial nerve.

(B) Facial Sling :

The Aim is to support the facial Tissues & To mask the deformity.

**[II] Cancer Submandibular Gland**

Total Submandibular Sialadenectomy
+ Total Block Dissection

(B) Inoperable**[I] Palliative Resection****[II] Radiotherapy : But poor result****Maxilo-Facial Injuries****■ Priorities in treatment :**

- ① Ensure patent airway.
- ② Ensure effective breathing (Tracheostomy or Mechanical ventilation).
- ③ Control any visible bleeding source.
- ④ Anti shock measures, Antibiotics, Antititatic serum & Analgesics.

[A] Soft Tissue Injuries

- ① Skin wounds : (look wounds)
- ② Facial nerve :
 - Nerve repair by direct end to end anastomosis.
 - Nerve graft if lacerated or lost segment.
- ③ Parotid injury :
 - Duct → end to end anastomosis over a stent.
 - Gland → if extensive injury or persistent salivary fistula → superficial conservative parotidectomy.
- ④ Eye lids :
 - Suture all layers but avoid ptosis or ectropion from over correction.
 - Lacrimal duct → repair microsurgically over a stent.
- ⑤ Nasal injuries : Sutured in 2 layers.
- ⑥ Lips : Sutured in 3 layers with respect to the red margin.
- ⑦ For injuries : Sutured by cutaneous perichondral sutures.

[B] Fracture of Facial Bones

[1] Mandibular Fractures :

- * Site :
- ① The body : Fracture usually occurs close to the mental foramen.
 - ② The coronoid process : least important, as the temporalis muscle prevent displacement.
 - ③ The condyle : Usually indirect # caused by blow to the chin.
 - ④ The angle : the # line is usually splinted by the masseter and pterygoid muscles, with minimal displacement.

* Clinical Picture :

- Pain on attempts to open the mouth.
- Dribbling of blood stained saliva.
- Impairment of speech & swallowing.
- Swelling & haematoma of the floor of the mouth + tenderness & crepitus.
- Irregularity of the line of the teeth.

* Treatment :

Reduction & fixation (3 weeks)

- By
- a. Interdental wire.
 - b. Arch bars.
 - c. Plate & screws.

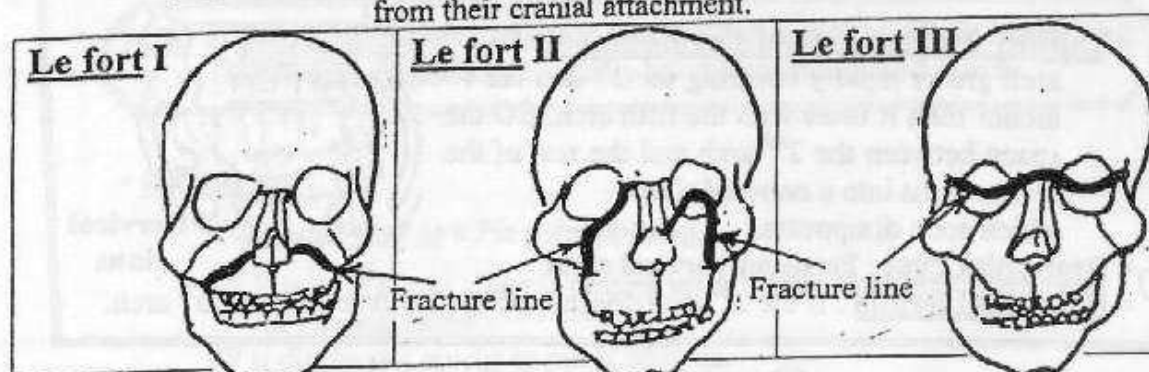
Then mouth wash by Anti-septic solutions.

[2] Fractures Maxilla :

* Clinical Picture : Pain, salivation, epistaxis, diplopia, swelling and crepitation.

* Classification : (Le fort)

- Le Fort I : Transverse # above the level of the teeth. It is treated by inter maxillary fixation, which in turn is fixed to the inferior orbital margin.
- Le fort II : Pyramidal #, traversing the nasal bones, frontal process of maxilla, lacrimal bones, inferior orbital margin and lateral wall of maxilla.
- Le fort III : craniofacial disjunction (i.e.) separation of the facial bones from their cranial attachment.



[3] Nasal Fractures :

* Clinically : Pain, swelling, epistaxis & crepitus.

* Treatment : Instrumental manipulation to reduce the fracture. The position is then fixed by intra-nasal packing for 3 days with an external splint for 7 days.

[4] Zygomatic Fractures :

* Clinically : There is pain, swelling in eyelids, flat cheek + numbness due to injury of the infra-orbital nerve, crepitus and irregular infra-orbital margin.

* Treatment : Reduction of the depressed bone + fixation by wires ligated through burr holes.

[5] Tempo-mandibular joint dislocation :

* Clinically : Pain & dysarthria, the mouth is held open with fixed jaws. In unilateral cases, the chin is deviated to the opposite side.

* Treatment :

- ① Reduction by downward traction on the molars with the padded thumb, together with upward rotation of the body with the outside fingers.
- ② In neglected cases condylectomy is performed.
- ③ In recurrent cases excision of the meniscus is done to deepen the glenoid cavity.

Neck Surgery

I

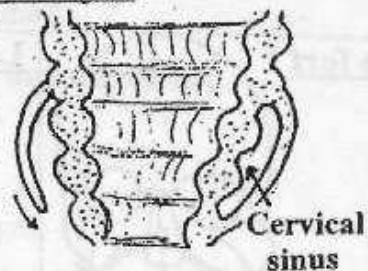
Branchial cyst & Fistula

Origin

■ In Embryo :

- The neck starts to develop between the head and the developing heart.
- 5 Ridges develop on each side of the neck called branchial arches.
 - The 1st arch forms the Mandible and the Ear.
 - The 2nd arch forms the Hyoid region.
 - The 3rd arch forms the neck over the thyroid region.

- During Embryological development the 2nd arch grows rapidly covering the 3rd and the 4th arches then it fuses with the fifth arch. **SO** the space between the 2nd arch and the rest of the arches turns into a cervical sinus which soon disappears.



SO ■ Branchial cyst : Persistent cervical sinus.

■ Branchial fistula : If the 2nd arch doesn't completely fuse with the 5th arch.

(A) Branchial Cyst

* Clinical Picture :

- Age : Congenital but may be represented at childhood or later at age of 20 years.
- Site : Upper part of side of neck just below the angle of mandible deep to anterior border of upper 1/3 of sternomastoid
- Characters :
 - ① Moderate in size about 5 cm.
 - ② Globular, Smooth, Well defined, Tense cystic & Opaque.
 - ③ On contracting Sternomastoid, the mass bulges out.



BRANCHIALCYST

* Pathology :

- Lined by Squamous epithelium.
- Surrounded by Lymphoid tissues which explain its frequent inflammation.
- Contains mucus rich in Cholesterol crystals.

* Treatment :

Complete Excision through a transverse incision.

(B) Branchial Fistula

If the 2nd arch doesn't completely fuse with the 5th arch. It is usually **Congenital** but sometimes it is **Acquired**.

Congenital Branchial Fistula

* Clinical Picture :

- **Age** : Present since birth.
- **Site** : External opening lies deep to lower 1/3 of Sternomastoid near it's anterior border.

N.B. : The Fistula passes between E.C.A & I.C.A to end highly in lateral wall of pharynx behind tonsil, usually blind or rarely opened into it

▪ Characters :

- ① It represents as a Pin point opening.
- ② Fistula is felt as a thread passing up & deeply through anterior part of sternomastoid.
- ③ It discharges mucus or pus if infected.

N.B. : The fistula may be confused with T.B sinus

* Pathology : The Track is ↻

- Lined by Squamous Epithelium & Extends up to the side wall of nasopharynx "Fossa of Rosenmuller"
- Surrounded by Lymphoid tissues which explain it's frequent inflammation.
- Contains mucus rich in Cholesterol crystals.

* Treatment :

Complete Excision of whole track through, multiple Transverse neck incisions; a Small one around External opening & The Other at a higher level just below the Jaw.

Acquired Branchial Fistula

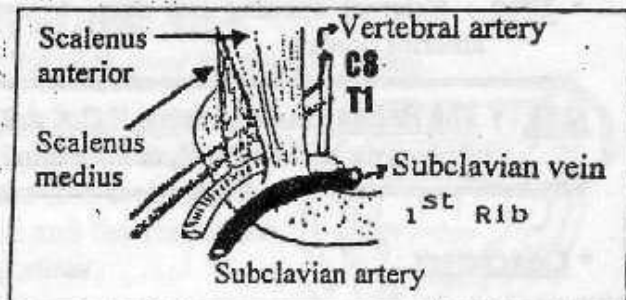
- Due to Rupture of inflamed branchial cyst or Incomplete removal of cyst.
- Clinical picture & Pathology as Congenital type.
- Treatment as Congenital type.

II

Thoracic Outlet Syndrome**"Cervical Rib"****Introduction**

The **Brachial plexus** & The **Subclavian artery** pass to the upper limb through a narrow triangle in the base of the neck. This triangle is made up of

- Anteriorly :
Scalenus anterior muscle.
- Posteriorly :
Scalenus medius muscle.
- Inferiorly :
The 1st rib.



At this narrow space compression of nerves & artery may occur.

*** Aetiology :**

- Cervical Rib : Which may be complete or incomplete
This bony structure extends from the 7th cervical vertebra to the 1st rib.

N.B. : Fibrous Band Extending from an incomplete cervical rib & Ending at 1st rib

- A tight scalene muscles.
- Post-fixation of brachial plexus.
In this case the lower root of brachial plexus arises from **T₁** instead of **T₁**. Thus, This nerve becomes excessively bent over the 1st rib.

*** Complications :**

- The Lower root of brachial plexus is compressed so leads to Sensory & Autonomic affection of upper limb.
- The Subclavian artery is compressed so leads to Chronic ischaemia of upper limb but less common.
- Post-stenotic Dilatation :
It is Aneurysmal dilatation of Subclavian artery, which may send a shower of emboli to the Index & Middle fingers as they are the direct continuation of the brachial artery.

* Clinical Picture :

- Age : > 20 years.
- Sex : Female > Male.
- Manifestations :

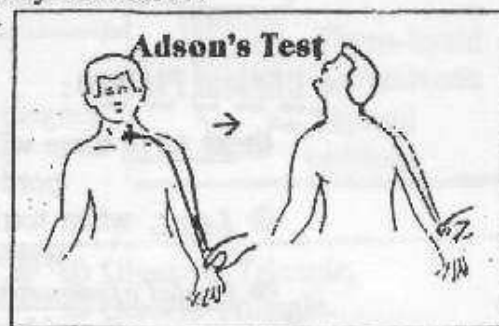
(A) Symptoms

- ① Vascular : Intermittent Claudications.
- ② Vasomotor : Raynaud's Phenomenon due to irritation of sympathetic fibers.
- ③ Nervous : Tingling & Numbness especially in the medial aspect of forearm and Hand due to compression on lower root of plexus.

(B) Signs

- ① Bony swelling at base of post. Triangle i.e. Cervical rib.
- ② Hypothesia & Wasting of hand muscles may be noticed.
- ③ Adson's Test :

1st palpate the radial pulse then Ask patient to turn his head elevate his chin & Take deep inspiration Then palpate again, if disappear → +ve Test for cervical rib.



* D.D :

(A) Other causes of Localized pressure

As Cervical Spondylosis or Carpal Tunnel Syndrome.

(B) Other causes of Raynaud's phenomenon

As Systemic Lupus or Collagen Disease.

* Investigations :

- Plain X-ray (Neck & Chest) may detect Bony cervical rib.

N.B. : In many persons a cervical rib is detected by radiography, yet it is asymptomatic. Also in many patients who have the clinical picture of thoracic outlet syndrome, radiography does not reveal a cervical rib.

- Arteriography : As Subclavian Angiography.
- Nerve conduction Study : To detect delayed conduction between neck and Forearm so help in D.D between Thoracic Outlet Syndrome & Carpal Tunnel Syndrome

* Treatment :

- Asymptomatic cases : No Treatment.
- Physiotherapy : To Strengthen the shoulder muscles.
- Surgery : ① Excision of bony cervical rib including it's periosteum.
 ② Excision of 1st rib to relieve the lower compression.
 ③ Scalenotomy i.e. Incision of Scalenus Anterior Muscle.

III

Congenital Torticollis*** Embryology:**

Sternomastoid muscle develops through the union of three somites each with its blood supply.

*** Aetiology:**

- Sometimes at birth, an interruption of blood supply to the central portion occurs causing muscle infarction. The infarcted portion becomes swollen, hence the name (**Sternomastoid Tumor**)
- After a while the infarcted portion is replaced by fibrous tissue that contracts causing congenital torticollis.

*** Clinical Picture:**

- ① At birth there will be a swelling, which is firm in consistency, at the middle portion of the sternomastoid muscle.
- ② Later, when torticollis develops, the head will be tilted to the side of the lesion with the face looking to the opposite side.
- ③ Facial asymmetry will later occur with flattening of the side of the face at the side of the lesion
- ④ This condition should be differentiated from [Wry Neck] which is fibrositis causing spasm of the sternomastoid muscle. This is a temporary disorder lasting for a day or two and responds to anti-inflammatory drugs.

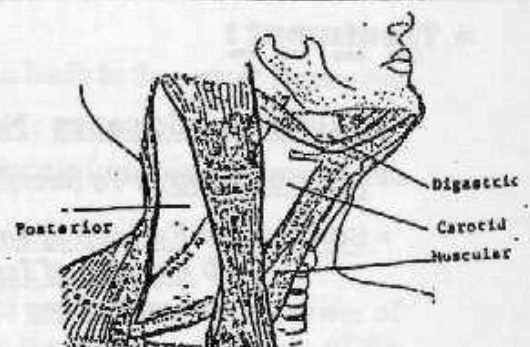
*** Treatment:**

- Early after birth (physiotherapy) is an attempt to prevent the development of the deformity by stretching the neck may be done.
- If the deformity is established: Division of the sternomastoid at its lower part should be done.

IV

DD of A Mass in the Neck

- The Diagnosis of a mass in the Neck, depends upon the Age of the patient, clinical course of the mass, its site & its consistency whether solid or cystic.
- The Most Common Swellings of neck are L.Ns & Thyroid gland.
- The 2nd Common Swelling of neck is Salivary Glands.

**Triangles in the Neck**

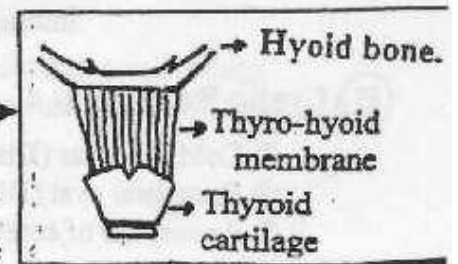
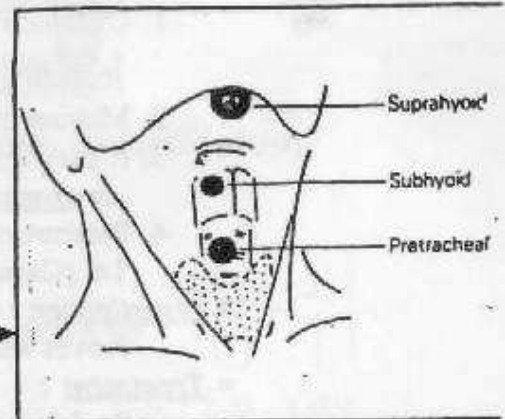
I DD of swellings at Mid line

A Solid Swellings :

- ① Submental L.Ns.
- ② Pre-tracheal & Pre-laryngeal L.Ns.
- ③ Nodule of isthmus of thyroid gland.

B Cystic Swellings :

- ① Cold Abscess.
- ② Thyroglossal Cyst (Discuss)
- ③ Dermoid cyst : Sublingual or Supra-sternal.
- ④ **Subhyoid Bursitis** : (Rare) Tender & oval swelling, which moves up and down with deglutition and protrusion of the tongue.
- ⑤ **Laryngocele** :
 - It is due to ↑ Intra-laryngeal pressure.
 - It occurs with glass bower or trumpet players or singers.
 - It is cystic, Resonant, Compressible & Shows expansile impulse on cough.
- ⑥ Cystadenoma of thyroid isthmus.



II DD of swellings at lateral Triangle

- ① Digastric Triangle.
- ② Carotid Triangle.
- ③ Posterior Triangle.

① Swellings at Digastric Triangle

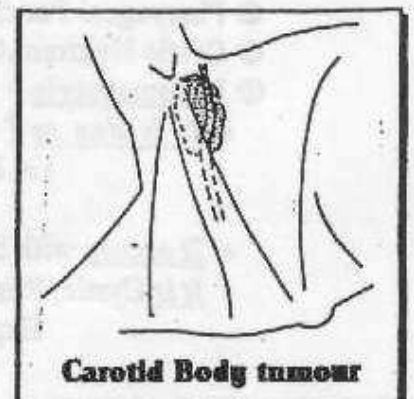
- A Enlarged Submandibular L.Ns.
- B Enlarged Submandibular Salivary gland.

★ **For DD:** The Submandibular L.Ns are multiple & can be rolled over edge of mandible unlike the submandibular gland.

② Swellings at Carotid Triangle

A Solid Swellings :

- ① Enlarged upper deep cervical L.Ns.
- ② Enlarged upper part of lateral lobe of a goitre.
- ③ **CAROTID BODY TUMOR** : (Potato Tumor)
 - It is a rare slowly growing malignant tumor.
 - It arises from the chemoreceptors which present at bifurcation of carotid artery.



■ It is characterized by :

1. Oval hard swelling with smooth or lobulated surface.
2. Moving from side to side but not vertically.
3. It may Pulsating the pulsation either Transmitted from carotid or expansile from high vascularity.
4. Pressure on swelling may cause fainting attack i.e. [Carotid sinus syndrome].

■ Investigation : (Angiography)

Proves widening of carotid bifurcation.

■ Treatment :

Excision of tumor with preservation of Internal carotid artery.

(B) Cystic Swellings:

- ① Cold Abscess (Discuss).
- ② Branchial cyst (Discuss)
- ③ Aneurysm of carotid artery.



Branchial Cyst

③ Swellings at Posterior Triangle

(A) Solid Swellings :

- ① Cervical rib. (Discuss)
- ② Neurofibroma arising from brachial plexus.
- ③ Enlarged L.Ns.
- ④ Sternomastoid tumor (Discuss)

(B) Cystic Swellings :

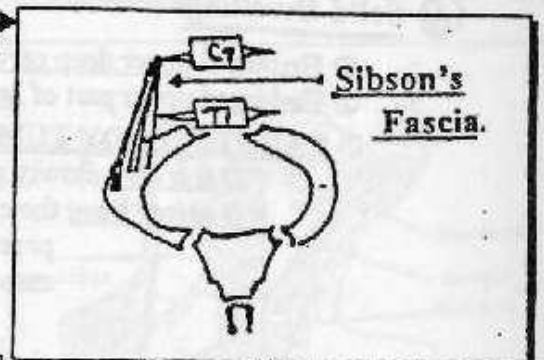
- ① Cold Abscess. (Discuss)
- ② Pharyngeal Pouch (See next page)
- ③ Cystic Hygroma (Discuss)
- ④ Pneumatocele

- It is due to ↑ Intra - thoracic pressure
i.e. Herniation of pleura. Through,
Sibson's Fascia.

- It occurs with Emphysematous patients.
- It is Cystic, Resonant, Compressible & Shows
Expansile impulse on cough.



Pharyngeal Pouch



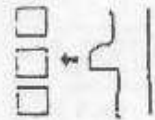
★ In Addition to that Any Skin or S.C Tissue Swellings
as lipoma, Sebaceous etc....

Pharyngeal Diverticulum

(Zenker's Diverticulum = Pharyngo-oesophageal diverticulum)

★ Definition:

Herniation of pharyngeal mucosa through a weak area in the posterior pharyngeal wall.



Lat. View

★ Aetiology:

Spasm of crico-pharyngeus muscle (which fail to relax during swallowing)
 → ↑ pressure in the pharynx → Herniation of the mucous membrane posteriorly
 → So, food enter the diverticulum.

★ Clinical Picture :

■ Type of patient : old male.

■ Symptoms :

Progressive dysphagia with regurge of non digested food after meals.

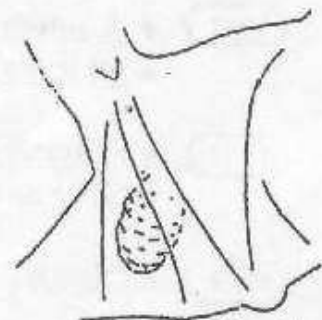
■ Signs :

Swelling characterized by ➤

① Soft & compressible at posterior triangle.

② Dull or resonant on percussion.

③ Gurgling sound can be elicited if patient swallow several glups of air.



Pharyngeal Pouch

★ Complications:

① Aspiration pneumonia.

② Diverticulitis.

③ Carcinoma (0.3%).

★ Investigations:

[A] Barium swallow : The Best.

[B] Endoscopy (Not done) because high risk of perforation.

★ Treatment:

According to the size of diverticulum

[A] Small : Repeated dilatation of crico-pharyngeus muscle.

[B] Moderate : Diverticulopexy by invagination & plication.

[C] Large : Diverticulectomy.



Final Written Exams



Head & Neck

- (1987) • Discuss cystic swellings of Post. Δ of Neck (10 Marks)
- (1989) • Discuss DD of Ulcer of Tongue. (10 Marks) نور ثانی
• Anatomy of Post. Triangle of Neck. (5 Marks)
• Discuss DD of swelling of Post. Δ of Neck. (15 Marks)
- (1990) • Discuss swellings of the Jaw (25 Marks) نور ثانی
- (1991) • Anatomy of Post. Triangle of Neck. (10 Marks)
• Discuss DD of swellings in same Δ (20 Marks)
- (1992) • Discuss DD of ulcer of Tongue. (10 Marks) نور ثانی
• Give an account on Branchial cyst. (10 Marks) نور ثانی
- (1993) • Discuss Path., C/P & ttt of Cancer Lip (20 Marks) نور ثانی
- (1995) • Discuss Anatomy of submandibular salivary gland (10 Marks) نور ثانی
- (1997) • Discuss Path. & Spread of Cancer Tongue (15 Marks)
- (1998) • Discuss Parotid tumors (10 Marks)
• Discuss Tongue ulcers (10 Marks)
- (1999) • Discuss Path. & Spread of Cancer Tongue (10 Marks) نور ثانی
- (2000) • Discuss pathology & C/P of Odontomas (15 Marks) نور ثانی
• Discuss C/P & Spread of Cancer Tongue (10 Marks) نور ثانی
- (2001) • Discuss Path., C/P of cancer Tongue (10 Marks)
- (2002) • Mention Pre-cancerous lesions of Tongue (10 Marks) دور ثانی
• Discuss DD of ulcers of tongue. (12 Marks)
• Discuss DD of swellings in post. Δ (12 Marks)
- (2003) • Discuss DD of swellings in post Δ (9 Marks) دور ثانی
• Discuss DD of ulcers of tongue (9 Marks) دور ثانی
- (2004) • Discuss C/P & ttt of thoracic outlet syndrome (20 marks) نور ثانی

